SLV-E130: AE1, AE2/E177EG/E180: EE, EG/E230: AE, CP, EY, UY, VP1, VP2/E285: B, VC/E295: CP, UX, VC1, VC2/E380: EE, EG/E430: AE, B, CP, VC, VP/E477EG/E480: EE, EG/E530: B, CP, UX, VC
RMT-V220/V220B/V221/V221A/V221B/V221C/V221D/V221E/V222/V222A/V222B

SERVICE MANUAL

Photo: SLV-E530

S MECHANISM

VIDEOPlus+

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENTS VI for MECHANICAL ADJUSTMENTS. (9-921-647-11)**

AEP Model
SLV-E130AE1/E130AE2/E230AE/E430AE

French Model
SLV-E285B/E430B/E530B

Spanish Model
SLV-E230CP/E295CP/E430CP/E530CP

East European Model
SLV-E180EE/E380EE/E480EE

Middle European Model
SLV-E177EG/E180EG/E380EG/ E477EG/E480EG

Irish Model
SLV-E230EY

UK Model
SLV-E230UY/E295UX/E530UX

German Model
SLV-E230VP1/E230VP2/E285VC/E295VC1/ E295VC2/E430VC/E430VP/E530VC

* The abbreviations of E130, E177, E180, E230, E285, E295, E380, E430, E477, E480 and E530 contained in this service manual are indicated when these models are common to all their corresponding models as given below.

Abbreviated model name	E130	E177	E180	E230	E285	E295	E380	E430	E477	E480	E530
All model names SLV-	E130AE1 E130AE2	E177EG	E180EE E180EG	E230AE E230CP E230EY E230UY E230VP1 E230VP2	E285B E285VC	E295CP E295UX E295VC1 E295VC2	E380EE E380EG	E430AE E430B E430CP E430VC E430VP	E477EG	E480EE E480EG	E530B E530CP E530UX E530VC

VHS PAL NTSC4.43 **VIDEO CASSETTE RECORDER**

MICROFILM

SONY®

SPECIFICATIONS

System

Channel coverage

- SLV-E130/E230AE/E230CP/E230VP/E285VC/E295CP/E295VC/E430AE/E430CP/E430VC/E430VP/E530CP/E530VC:
  PAL (B/G)
  VHF E2 – E12
  (VHF Italian channel A to H)
  UHF E21 – E69
  CATV S01 – S05, S1 – S20
  HYPER S21 – S41
- SLV-E177/E180/E380/E477/E480:
  PAL (D/K, B/G)
  VHF R1 – R12, E2 – E12
  UHF R21 – R69, E21 – E69
  CATV S01 – S05, S1 – S20
  HYPER S21 – S41
- SLV-E230EY:
  PAL (I)
  VHF A-J
  UHF B21 – B69
  CATV S01 – S05, S1 – S20
  HYPER S21 – S41
- SLV-E230UY/E295UX/E530UX:
  PAL (I)
  UHF B21 – B69
- SLV-E285B/E430B/E530B:
  PAL (B/G)
  VHF E2 – E12
  (VHF Italian channel A to H)
  UHF E21 – E69
  CATV S01 – S05, S1 – S20
  HYPER S21 – S41
  SECAM (L)
  VHF F2 – F10
  UHF F21 – F69
  CATV B – Q
  HYPER S21 – S41

RF output signal
  UHF channels 21 – 69
Aerial out
  75-ohms asymmetrical aerial socket

Inputs/outputs

- SLV-E130/E177/E180EG/E230EY/E230UY/E380EG/E477/E480EG:
  ⊃ LINE-1 (TV)
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
    Video output: pin 19
    Audio output: pins 1 and 3
- SLV-E180EE/E380EE/E480EE:
  LINE-1 IN
    VIDEO IN, phono jack (1)
    Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
    AUDIO IN, phono jack (1)
    Input level: 327 mVrms
    Input impedance: more than 47 kilohms
  LINE-2 IN (SLV-E380EE)
    VIDEO IN, phono jack (1)
    Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
    AUDIO IN, phono jack (1)
    Input level: 327 mVrms
    Input impedance: more than 47 kilohms
  LINE OUT
    VIDEO OUT, phono jack (1)
    Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
    AUDIO OUT, phono jack (1)
    Standard output: 327 mVrms
    Load impedance: 47 kilohms
    Output impedance: less than 10 kilohms
- SLV-E230AE/E230CP/E230VP/E285VC/E430AE/E430CP/E430VC/E430VP:
  ⊃ LINE-1 (TV)
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
    Video output: pin 19
    Audio output: pins 1 and 3
  DECODER/⊂ LINE-2 IN (SLV-E230CP, E285VC, E430VC/CP)
  ⊃ LINE-2 (SLV-E430AE/VP)
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
- SLV-E285B/E430B:
  ⊃ LINE-1 (TV)
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
    Video output: pin 19
    Audio output: pins 1 and 3
  DECODER/⊂ LINE-2 IN
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
- SLV-E295CP/E295VC/E530B/E530CP/E530VC:
  ⊃ LINE-1 (TV)
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
    Video output: pin 19
    Audio output: pins 1 and 3
  DECODER/⊂ LINE-3 IN
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
  LINE-2 IN
    VIDEO IN, phono jack (1)
    Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
    AUDIO IN, phono jack (1)
    Input level: 327 mVrms
    Input impedance: more than 47 kilohms
- SLV-E295UX/E530UX:
  ⊃ LINE-1 (TV)
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
    Video output: pin 19
    Audio output: pins 1 and 3
  ⊂ LINE-3 IN
    21-pin
    Video input: pin 20
    Audio input: pins 2 and 6
  LINE-2 IN
    VIDEO IN, phono jack (1)
    Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
    AUDIO IN, phono jack (1)
    Input level: 327 mVrms
    Input impedance: more than 47 kilohms

General

Power requirements
  220 – 240 V AC, 50 Hz
Power consumption
  20W
Operating temperature
  5 ˚C to 40 ˚C
Storage temperature
  –20 ˚C to –60 ˚C
Dimensions
  Approx. 355 × 96 × 285 mm (w/h/d) including projecting parts and controls
Mass
  Approx. 3.9 kg

Supplied accessories

Remote commander (1)
R6 (size AA) batteries (2)
Aerial cable (1)

Design and specifications are subject to change without notice.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

• **Feature Difference**

SLV- / FEATURE	E130AE1/ E130AE2	E177EG/ E180EG	E180EE	E230AE/ E230VP1/ E230VP2	E230CP	E230EY/ E230UY
4 Head VIDEO						
LP REC						O
NTSC (REC/PB)		✕/O	✕/O			
SECAM (REC/PB)						
ME-SECAM (REC/PB)		O/O	O/O			
LINE1 RCA or EUR	EUR	EUR	RCA	EUR	EUR	EUR
FRONT IN						
EUR IN (2nd)						
C+ (2nd)					O (SW, C+)	
RF OUT SYSTEM	G	K/G	K/G	G	G	I
CLICK SHUTTLE						
REMOTE COMMANDER RMT-	V220	V220	V220	V221	V221	V221A

SLV- / FEATURE	E285B	E285VC	E295CP/ E295VC1/ E295VC2	E295UX	E380EE	E380EG
4 Head VIDEO						
LP REC			O	O		
NTSC (REC/PB)	✕/O	✕/O	✕/O	✕/O	✕/O	✕/O
SECAM (REC/PB)	O/O					
ME-SECAM (REC/PB)	✕/O				O/O	O/O
LINE1 RCA or EUR	EUR	EUR	EUR	EUR	RCA	EUR
FRONT IN			O	O	O	
EUR IN (2nd)				O		
C+ (2nd)	O (SW, C+)	O (SW, C+)	O (SW, C+)			
RF OUT SYSTEM	L/G	G	G	I	K/G	K/G
CLICK SHUTTLE					O	O
REMOTE COMMANDER RMT-	V221B	V221	V222	V222A	V220	V221

SLV- / FEATURE	E430AE/ E430VP	E430B	E430CP/ E430VC	E477EG	E480EE	E480EG	E530B	E530CP/ E530VC	E530UX
4 Head VIDEO	O	O	O	O	O	O	O	O	O
LP REC	O	O	O	O	O	O	O	O	O
NTSC (REC/PB)	✕/O	✕/O	✕/O	✕/O	✕/O	✕/O	✕/O	✕/O	✕/O
SECAM (REC/PB)		O/O					O/O		
ME-SECAM (REC/PB)		✕/O		O/O	O/O	O/O	✕/O		
LINE1 RCA or EUR	EUR	EUR	EUR	EUR	RCA	EUR	EUR	EUR	EUR
FRONT IN							O	O	O
EUR IN (2nd)	O								O
C+ (2nd)		O (SW, C+)	O (SW, C+)				O (SW, C+)	O (SW, C+)	
RF OUT SYSTEM	G	L/G	G	K/G	K/G	K/G	L/G	G	I
CLICK SHUTTLE							O (JOG)	O (JOG)	O (JOG)
REMOTE COMMANDER RMT-	V221E	V221C	V221E	V221D	V220B	V221E	V222B	V222	V222A

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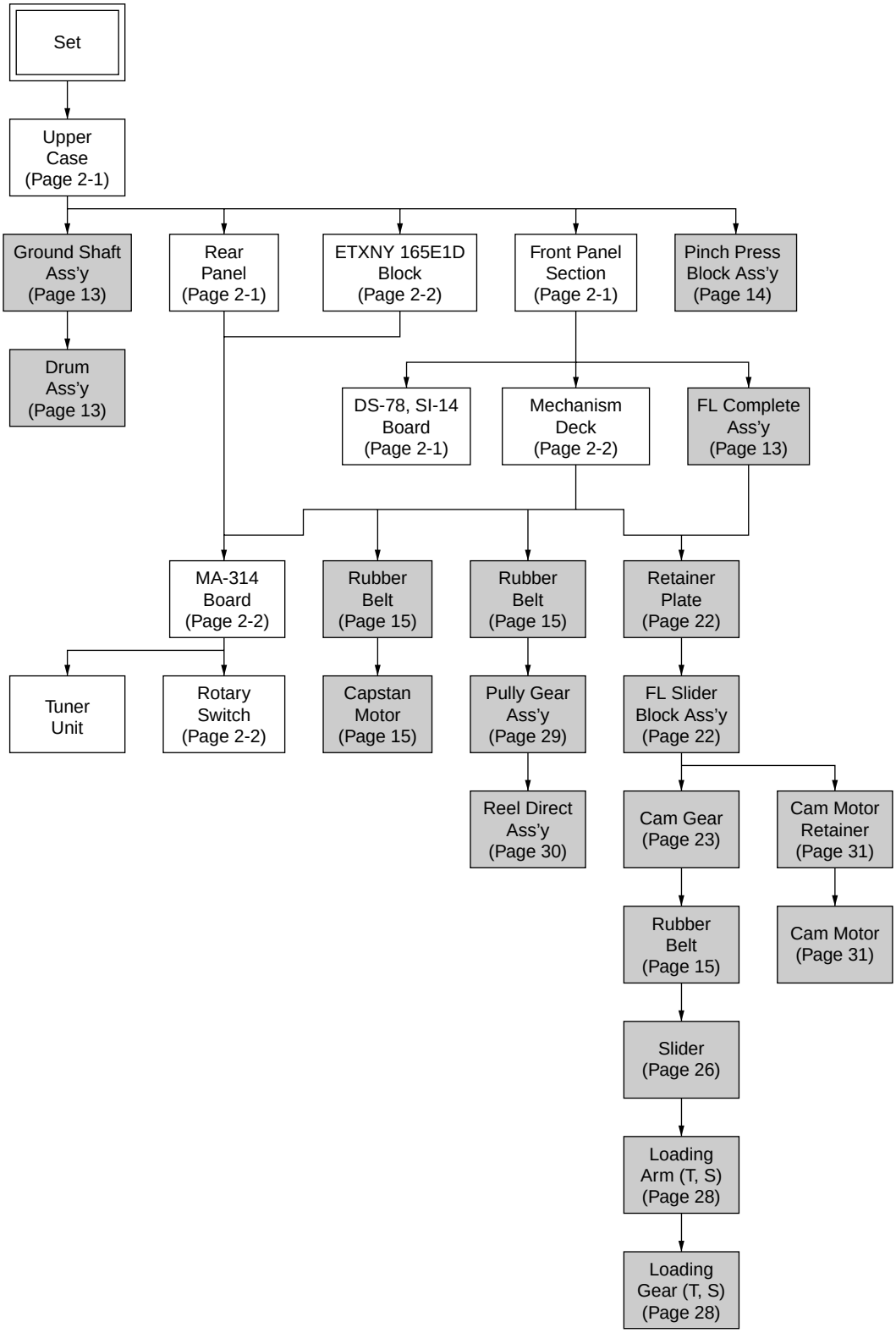
SERVICE NOTE

1. DISASSEMBLY

• This set can be disassembled in the order shown below.

Note: Pages in ☐ indicate pages in the SERVICE MANUAL.
Pages in ▭ indicate pages in the VHS MECHANICAL ADJUSTMENT MANUAL VI.


Set
Upper Case (Page 2-1)
Ground Shaft Ass'y (Page 13)
Rear Panel (Page 2-1)
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Front Panel Section (Page 2-1)
Pinch Press Block Ass'y (Page 14)
Drum Ass'y (Page 13)
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Rubber Belt (Page 15)
Cam Motor (Page 31)
Slider (Page 26)
Loading Arm (T, S) (Page 28)
Loading Gear (T, S) (Page 28)

SECTION 1 GENERAL

This section is extracted from SLV-E530UX, SLV-E295UX instruction manual.

Step 1

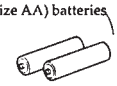
Unpacking

Check that you have received the following items with the VCR:

- Remote commander

- Aerial cable

- R6 (size AA) batteries



Checking your model name

The instructions in this manual are for the 2 models : SLV-E295UX, and E530UX. Check your model number by looking at the rear panel of your VCR. The SLV-E530UX is the model used for illustration purposes. Any difference in operation is clearly indicated in the text, for example, "SLV-E530UX only."

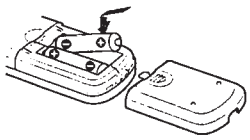
Step 2

Setting up the remote commander

Inserting the batteries

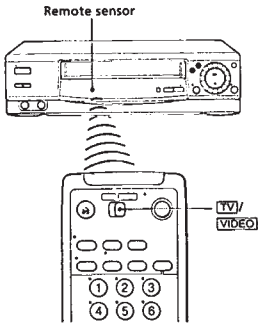
Insert two R6 (size AA) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.

Insert the negative (–) end first, then push in and down until the positive (+) end clicks into the position.



Using the remote commander

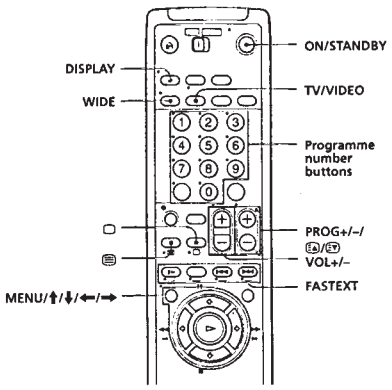
You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your Sony TV.



To operate	Set TV / VIDEO to
the VCR	VIDEO and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

continued

Step 2 : Setting up the remote commander (continued)



TV control buttons

To	Press
Turn the TV into standby or active mode	ON/STANDBY
Select an input source of the TV either from aerial in or from line in	TV/VIDEO
Select the programme position of the TV	Programme number buttons PROG +/–
Adjust the volume of the TV	VOL +/–
Switch to TV (Teletext off)	▢ (TV)
Turn on the TV/switch to Teletext	▤ (Teletext)
Use FASTEXT	FASTEXT buttons
Call up on-screen display	DISPLAY
Change the Teletext page	ⓐ/ⓣ
Operate TV menu options	MENU/↑/↓/←/→
Switch the wide mode of a Sony wide TV	WIDE

Notes

- With normal use, the batteries should last about three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

Controlling other TVs with the remote commander

The remote commander is preprogrammed to control non-Sony TVs. If your TV is listed in the table below, set the appropriate manufacturer's code number.

1 Set TV / VIDEO at the top of the remote commander to TV.

2 Hold down ON/STANDBY, and enter your TV's code number(s) using the programme number buttons. Then release ON/STANDBY.
Now you can use the following TV control buttons to control your TV: ON/STANDBY, TV/VIDEO, programme number buttons, PROG +/–, VOL +/–, ▢ (TV), ▤ (Teletext), FASTEXT buttons, WIDE, MENU, ↑/↓/←/→ and OK with some TV.

Tip

- If you set your TV's code number correctly while the TV is turned on, the TV turns off automatically.

continued

Step 2 : Setting up the remote commander (continued)

Code numbers of controllable TVs

If more than one code number is listed, try entering them one at a time until you find the one that works with your TV.

To make wide mode settings, see the footnotes below this table for the applicable code numbers.

Manufacturer	Code number
Sony	01*1, 02
Akai	68
Ferguson	52
Grundig	10*1, 11*1
Hitachi	27*1, 28*1, 50*1, 51*1
Mitsubishi	09
NEC	66
Nokia	15, 16, 69*3
Panasonic	17*1, 49

Manufacturer	Code number
Philips	06*1, 07*1, 08*1
Saba	12, 13
Samsung	22, 23
Sanyo	25
Sharp	29
TEAC	67
Telefunken	36
Thomson	43*2
Toshiba	38

*1 Press WIDE to switch the wide picture mode on or off.
*2 Press WIDE, then press VOL +/– to select the wide picture mode you want.
*3 Press WIDE. The menu appears on the TV screen. Then, press ↑/↓/←/→ to select the wide picture you want and press OK.

Notes

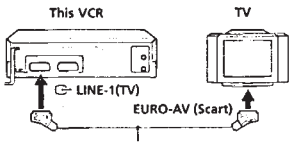
- If the TV uses a different remote control system from the one programmed to work with the VCR, you cannot control your TV with the remote commander.
- If you enter a new code number, the code number previously entered will be erased.
- When you replace the batteries of the remote commander, the code number automatically resets to 01 (Sony). Reset the appropriate code number.

Step 3 : Connecting the VCR (continued)

Additional connection

To a TV that has a EURO-AV (Scart) connector

This additional connection improves picture and sound quality. Connect the TV as shown on the right. Whenever you want to watch the VCR picture, press TV/VIDEO to display the VIDEO indicator in the display window.



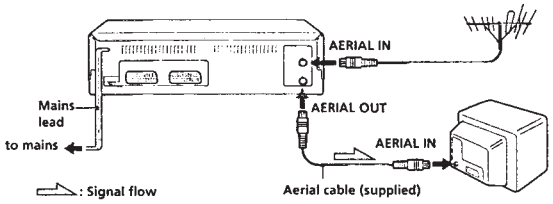
VMC-2121 EURO-AV cable (not supplied)

Note

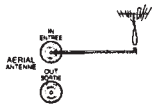
- When you connect the VCR and your TV only with an aerial cable, you have to set RF MODULATOR in the OPTIONS menu to ON (initial setting).
  If the TV is connected to the LINE-1(TV) connector, setting RF MODULATOR in the OPTIONS menu to OFF is recommended. In the OFF position, only the signal from the aerial is output through the AERIAL OUT connector (see page 52).

Step 3

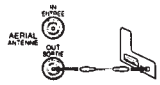
Connecting the VCR



1 Disconnect the aerial cable from your TV and connect it to AERIAL IN on the rear panel of the VCR.



2 Connect AERIAL OUT of the VCR and the aerial input of your TV using the supplied aerial cable.

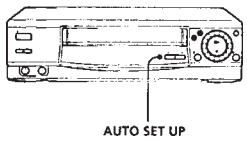


3 Connect the mains lead to the mains.

continued

Step 4

Setting up the VCR with the Auto Set Up function



Before using the VCR for the first time, set up the VCR using the Auto Set Up function. With this function, you can set TV channels, guided by the sequence indicated in the display window.

Hold down AUTO SET UP on the VCR for more than three seconds.

The ATP (Auto Tuner Preset) function starts searching for all of the receivable channels and presets them with the guide channels for VIDEO Plus+ in the following order.

Station	Guide Channel
BBC1	1
BBC2	2
ITV	3
CH4	4
CH5	5

After the search is complete, the current time appears in the display window for any stations that transmit a time signal.

To cancel the Auto Set Up function

Press AUTO SET UP.

Tip

- If you want to change the language for the on-screen display from English, see page 19.

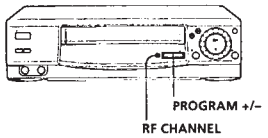
Note

- Do not cancel the Auto Set Up function during the ATP operations. If you do, repeat the step above.

Step 5

Tuning your TV to the VCR

If you connect the VCR to your TV using the EURO-AV cable, skip this step.

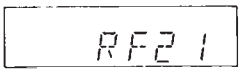


1 AUTO SET UP / RF CHANNEL

Press RF CHANNEL on the VCR.

The RF channel appears in the display window.

The VCR signal is output through this channel to the TV.



2

Turn on your TV and select a programme position for the VCR picture.

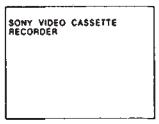
This programme position will now be referred to as the video channel.

3

Tune the TV to the same channel as that shown in the display window so that the picture on the right appears on the TV screen.

Refer to your TV manual for tuning instructions.

If the picture does not appear clearly, see "To obtain a clear picture from the VCR" on page 13.



4 AUTO SET UP / RF CHANNEL

Press RF CHANNEL.

You have now tuned your TV to the VCR. Whenever you want to play a tape, set the TV to the video channel.

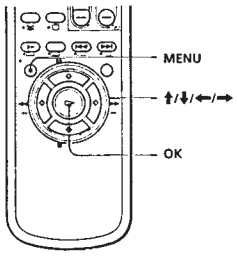
To check to see if the TV tuning is correct

Set the TV to the video channel and press PROGRAM +/– on the VCR. If the TV screen changes to a different programme each time you press PROGRAM +/–, the TV tuning is correct.

To obtain a clear picture from the VCR

If the picture does not appear clearly in step 3 above, go to step 4 to finish this procedure once. Then start from step 1. After pressing RF CHANNEL in step 1 to display the RF channel, press PROGRAM +/– so that another RF channel appears. Then tune the TV to the new RF channel until a clear picture appears.

Manual setup — Setting the clock



You must set the time and date on the VCR to use the timer recording features properly.

The Auto Clock Set function works only if a station in your area is broadcasting a time signal.

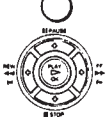
If the Auto Set Up function did not set the clock correctly for your local area, try another station for the Auto Clock Set function.

Before you start...

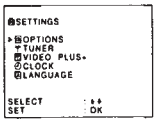
- Turn on the VCR and the TV.
- Set the TV to the video channel.

Setting the clock manually

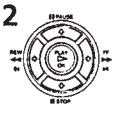
1 • MENU



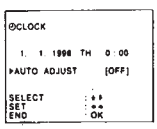
Press MENU, then press ↑/↓ to select SETTINGS and press OK.



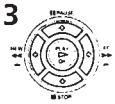
2



Press ↑/↓ to select CLOCK and press OK.

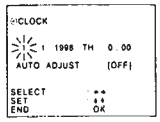


3

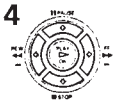


Press ↑/↓ to move the cursor (▶) to the clock row, then press ➡.

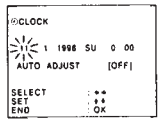
The day starts flashing.



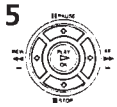
4



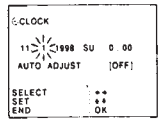
Press ↑/↓ to set the date.



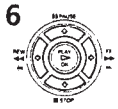
5



Press ➡ to flash the month and set the month using ↑/↓.

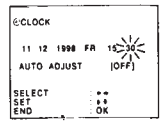


6

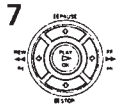


Set the year, hour, and minutes in sequence, using ➡ to flash the item to be set, and press ↑/↓ to select the digits.

The day of the week is set automatically.

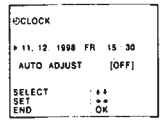


7



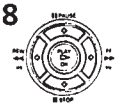
Press ➡ to start the clock.

The cursor (▶) appears at the beginning of the line.



continued

Manual setup — Setting the clock (continued)

8 

Press OK.

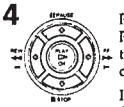
Tip

- To change the digits during setting, press ← to return to the item to be changed, and select the digits using ↑/↓.

Note

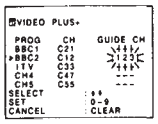
- The menu disappears automatically if you don't proceed for more than a few minutes.

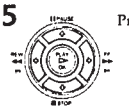
Manual setup — Setting the clock (continued)

4 

Press ↓ to move the cursor (▶) to CLOCK PROG, then press ←/→ repeatedly until the programme position of the station that carries the time signal appears.

If the VCR does not receive the time signal from any station, AUTO ADJUST returns to OFF automatically.



5 

Press OK.

Tip

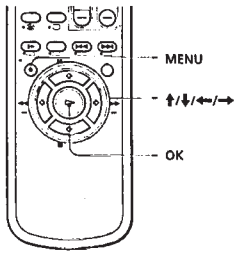
- If you set AUTO ADJUST to ON, the Auto Clock Set function is activated whenever the VCR is turned off. The date and time is adjusted automatically by making reference to the time signal from the station whose programme position is displayed in the "CLOCK PROG" row.

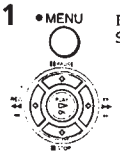
  If you do not need the Auto Clock Set function, select OFF.

Note

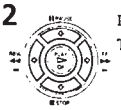
- The menu disappears automatically if you don't proceed for more than a few minutes.

Changing the station for the Auto Clock Set function

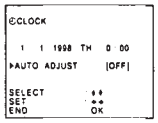


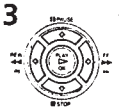
1 

Press MENU, then press ↑/↓ to select SETTINGS and press OK.

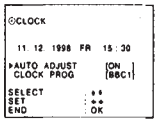
2 

Press ↑/↓ to select CLOCK and press OK.
The cursor (▶) is on AUTO ADJUST.



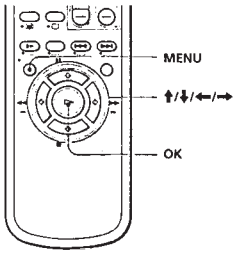
3 

Press → to select ON.



continued

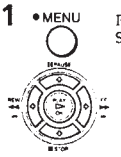
Manual setup — Selecting a language



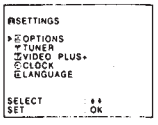
You can change the on-screen display language.

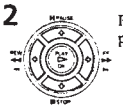
Before you start...

- Turn on the VCR and the TV.
- Set the TV to the video channel.

1 

Press MENU, then press ↑/↓ to select SETTINGS and press OK.



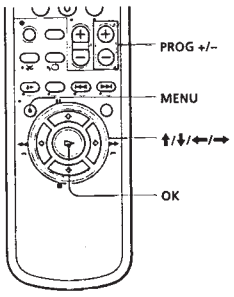
2 

Press ↑/↓ to select LANGUAGE, then press OK.

3

Press ↑/↓/←/→ to move the dot (●) to the desired language, then press OK.

Manual setup — Presetting channels

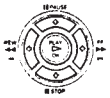


If some channels could not be preset using the Auto Set Up function, you can preset them manually.

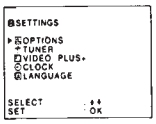
Before you start...

- Turn on the VCR and the TV.
- Set the TV to the video channel.

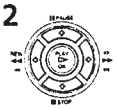
1 •MENU



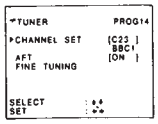
Press MENU, then press ↑/↓ to select SETTINGS and press OK.



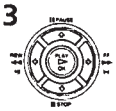
2



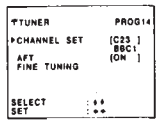
Press ↑/↓ to select TUNER, then press OK.



3



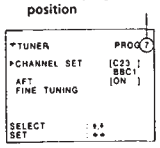
Press ↑/↓ to move the cursor (▶) to CHANNEL SET.



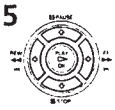
4 •PROG

Press PROG +/– to select the programme position.

Selected programme position



5

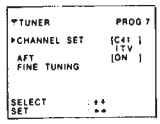


Press ←/→ repeatedly until the channel you want is displayed.

The channels appear in the following order:

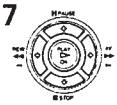
- UHF B21 - B69

If you know the number of the channel you want, press the programme number buttons. For example, for channel 5, first press "0" and then press "5."



6 To allocate another channel to another programme position, repeat steps 4 and 5.

7



Press OK.

Manual setup — Presetting channels (continued)

Disabling unwanted programme positions

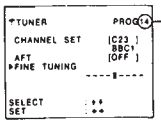
After presetting the channels, you can disable unused programme positions. The disabled positions will be skipped later when you press the PROG +/– buttons.

1. In step 5 above, press programme number button "0" twice to display the number "00" beside CHANNEL SET.
2. Press OK.

If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture is not clear, you may also use the manual tuning function.

1. Press PROG +/– to select the programme position for which you cannot obtain a clear picture.
2. Press MENU, then select SETTINGS and press OK.
3. Select TUNER and press OK.
4. Select FINE TUNING. The fine tuning meter appears.



Selected programme position

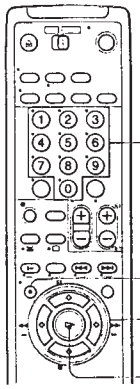
5. Press ←/→ to get a clearer picture, then press OK.

   Note that the AFT (Auto Fine Tuning) setting switches to OFF.

Note

- The menu disappears automatically if you don't proceed for more than a few minutes.

Manual setup — Setting up VIDEO Plus+



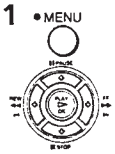
VIDEO Plus+ is a feature that simplifies programming the VCR to make timer recordings. To use VIDEO Plus+, each programme position needs to be matched with its VIDEO Plus+ guide channel. To get the guide channel numbers, see "Guide channels for VIDEO Plus+" on page 25, or look in the programme guide for your area that features PlusCode.

- If you want to record satellite broadcasts using VIDEO Plus+, see page 26.

Before you start...

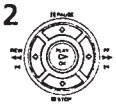
- Turn on the VCR and the TV.
- Set the TV to the video channel.

1 •MENU



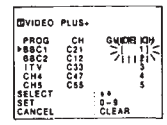
Press MENU, then press ↑/↓ to select SETTINGS and press OK.

2



Press ↑/↓ to select VIDEO PLUS+ and press OK.

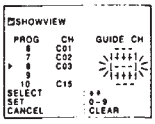
The preset channels are displayed on the screen. "- - -" in the GUIDE CH column means that the guide channel has not been preset.



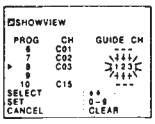
continued

3 Press ↑/↓ to move the cursor (▶) to the row on which you want to set the guide channel.

To display other pages for programme positions 6 to 60, press ↑/↓ repeatedly.



4 Press programme number buttons to enter the guide channel number assigned in the programme guide.



5 To set the guide channel of another station, repeat steps 3 to 4.

6 Press OK.

Guide channels for VIDEO Plus+

Guide channel	Station name
001	BBC1
002	BBC2
003	ITV
004	CHANNEL 4
005	CHANNEL 5
006	RTE 1
007	RTE 2
008	TV NA GAELTACHTA
101	SKY ONE
102	SKY NEWS
103	SKY MOVIES
104	THE MOVIE CHANNEL
105	SKY SPORT
106	NICKELODEON
	PARAMOUNT CHANNEL
107	EUROSPORT
	QUANTOM TV
108	WARNER BROTHERS
109	MTV EUROPE
110	CHILDREN'S CHANNEL
	THE FAMLY CHANNEL
111	THE DISNEY CHANNEL
112	BBC WORLD SERVICE
113	RTL 4
114	FILMNET 2
	SUPER SPORT
	ADULT CHAN
115	RTL PLUS INTERNATIONAL
116	SAT 1
117	PREMIERE
118	3 SAT
119	SKY 2
119	FOX KIDS
120	PRO 7
121	TELE 5
122	TELECLUB
123	UK GOLD
124	TLC
	DISCOVERY
	REGAL SHOP

Guide channel	Station name
125	BRAVO
	HSND
	EBN
126	CNN
127	EURONEWS
128	PERFORMANCE
	THE ARTS CHANNEL
129	SKY MOVIES GOLD
	WEATHER
130	UK LIVING
	TELEVISION X FANTASY CHANNEL
131	GRANADA +
132	GRANADA TALK
132	SKY SCOTTISH
133	TV5 EUROPE
134	TVE INTERNATIONAL
135	MBC
	ARABIC
136	QVC
137	SPORTNET
138	COUNTRY MUSIC TV
	JAPANESE TV
140	SKY SPORT 2 & SOAPS & TRAVEL & HIST & SF
141	TV ASIA
142	GRANADA GOOD LIFE
142	GRANADA TV HIGH STREET
142	GRANADA FOOD + WINE
142	GRANADA HEALTH AND BEAUTY
142	GRANADA HOME + GARDEN
143	LIVE TV
144	SUPERCHANNEL
145	VIDEO HITS ONE
	VH-1 (ENGLISH)
146	SELECT TV
147	FILMNET 1 (24 HOUR)
148	SKY SPORT 3
	PLAYBOY TV
149	TNT
	CARTOON NETWORK

Note

- The guide channel codes listed above are as of 20 February 1997. If you have any questions about the guide channels, please consult your nearest Sony service facility or the marketing group of Sony UK.

continued

Setting up VIDEO Plus+ for satellite broadcasts

When your satellite tuner is connected via the AERIAL IN connector, first you have to set the programme position for each satellite channel using the TUNER menu. Then set the guide channel number for each satellite channel using the VIDEO Plus+ menu.

If your satellite tuner is connected via the LINE-1(TV) connector, you don't have to set programme positions nor guide channel numbers for satellite channels. Skip the following procedure.

1 Turn on the satellite tuner.

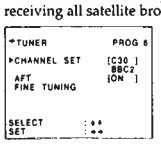
2 Press MENU, then select SETTINGS and press OK.

3 Select TUNER and press OK.

4 Press PROG +/– to select a programme position you want to use for watching a satellite channel.

5 Select CHANNEL SET, then press ←/→ repeatedly to tune the VCR to the satellite tuner.

The channel number displayed beside CHANNEL SET is used for receiving all satellite broadcasts from the satellite tuner.



6 Press PROG +/– to select another programme position for the next satellite channel, and press the programme number buttons to enter the same channel number as the one displayed in step 5.

Repeat this step for all satellite channels.

7 Set the guide channel number for each programme position assigned to the satellite channel, following the procedures on pages 23 and 24.

Notes

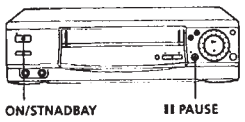
- The menu disappears automatically if you don't proceed for more than a few minutes.
- If you use a satellite tuner connected via the LINE-1 (TV) connector, you don't have to set up VIDEO Plus+. Just record a satellite programme using VIDEO Plus+, and the VCR automatically records the programme from the LINE-1 (TV) connector.
- If you inadvertently entered a guide channel number, press CLEAR.
- The VCR does not allow entering the guide channel number if the same number has been set.
- When you record a satellite broadcast using VIDEO Plus+, you need to select the desired channel on the satellite tuner manually.

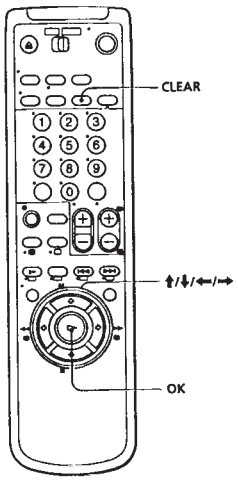
Setting your personal code

For identification, you can enter a personal code into the VCR. Once you enter your personal code, you can confirm it any time but can never change it.

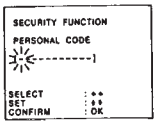
Before you start...

- Turn on the TV.
- Set the TV to the video channel.
- If there is a tape in the VCR, remove it.
- Turn off the VCR.

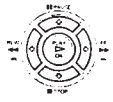




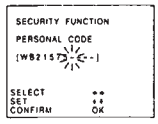
1 Hold down II PAUSE and ON/STANDBY on the VCR simultaneously for more than three seconds.



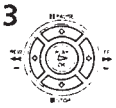
2 Enter your personal code.

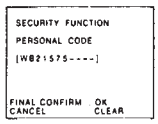


1 Press ↑/↓ to select a character.
Each time you press ↑, the character changes as shown below.
A → B → ... → Z → 0 → 1 → ... → 9 → (blank space) → - (hyphen) → A
2 Press → to set the next character.
The next space flashes.
To correct a character, press ←/→ until the character you want to correct flashes, then reset it.
You can set up to 11 characters for your personal code.

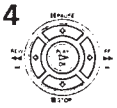


3 Press OK.
A confirmation screen appears.





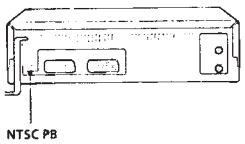
4 If the displayed personal code is correct, press OK.
If the displayed personal code is wrong, press CLEAR and continue from step 2.

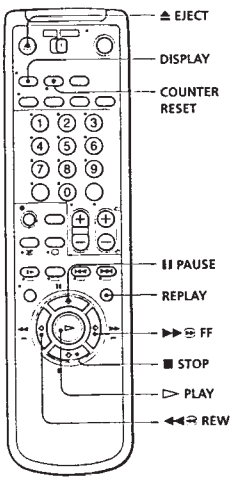


To confirm you personal ID

While the VCR is turned off and there is no tape in the VCR, hold down II PAUSE and ON/STANDBY on the VCR simultaneously for more than three seconds. The entered personal code appears on the TV screen. Press any button to enter normal viewing mode.

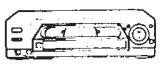
Playing a tape





1 Turn on your TV and set it to the video channel.

2 Insert a tape.
The VCR turns on and starts playing automatically if you insert a tape with its safety tab removed.



3 Press ▷ PLAY.
When the tape reaches the end, it will rewind automatically.

Additional tasks

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ▷ PLAY
Fast-forward the tape	▶▶ FF during stop
Rewind the tape	◀◀ REW during stop
Eject the tape	≜ EJECT

To replay a recently watched scene

You can immediately rewind and playback the scene you want to watch again.

During playback, press REPLAY up to four times. The VCR rewinds the tape about 10 seconds on the counter for each press of the button, and restarts playback.

To play an NTSC-recorded tape

Set NTSC PB at the rear of the VCR according to the colour system of your TV.

When your TV is	Set NTSC PB to
PAL only	ON PAL TV
PAL and NTSC	NTSC 4.43

To use the time counter

At the point on the tape that you want to find later, press COUNTER RESET. The counter in the display window resets to "0:00:00." Search for the point afterwards by referring to the counter.

To display the counter on the TV screen, press DISPLAY.

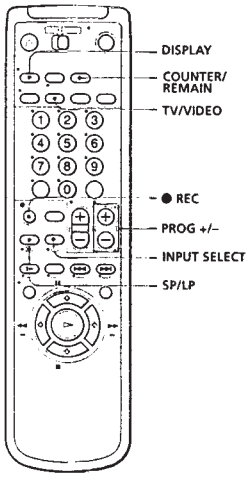
continued

Playing a tape (continued)

Notes

- The counter resets to "0:00:00" whenever a tape is reinserted.
- The counter stops counting when it comes to a portion with no recording.
- When you play back the tape recorded with the NTSC colour system, the counter does not appear on the TV screen.
- Depending on your TV, the following may occur while playing an NTSC-recorded tape:
  - The picture becomes black and white.
  - The picture shakes.
  - No picture appears on the TV screen.
  - Black streaks appear horizontally on the TV screen.
  - The colour density increases or decreases.
  - Deterioration of the picture quality may occur.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This is due to the difference between the counting cycles of the two video systems.
- While setting the menu on the TV screen, buttons for playback do not function.

Recording TV programmes



1 Turn on your TV and set it to the video channel.
To record from a decoder, turn it on.

2 Insert a tape with its safety tab in place.

3 INPUT SELECT

Press INPUT SELECT until a programme position number appears in the display window.

continued

Recording TV programmes (continued)

4 •PROG

Press PROG +/– to select the programme position you want to record.

5 SP/LP

Press SP/LP to select the tape speed, SP or LP.

LP (Long Play) provides recording time twice as long as SP (Standard Play), however, SP produces better picture and audio quality.

6 ● REC

Press ● REC to start recording.

The recording indicator lights up red in the display window.

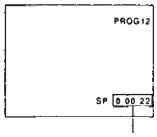
Recording indicator

To stop recording

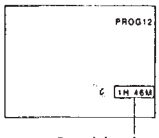
Press ■ STOP.

To check the remaining time

Press DISPLAY. With the display on, press COUNTER/REMAIN to check the remaining time. Each time you press COUNTER/REMAIN, the time counter and the remaining time appear alternately. The remaining time with the ⏲ indicator also appears in the display window.



Time counter



Remaining time

To correctly check the remaining time of the tape, set TAPE SELECT in the TAPE OPTIONS menu according to the tape type you use (see page 52).

To watch another TV programme while recording

1. Press TV/VIDEO to turn off the VIDEO indicator in the display window.
   If the TV is connected to the VCR using only the aerial cable, skip this step.
2. Select another programme position on the TV.

To save a recording

To prevent accidental erasure, break off the safety tab as illustrated. To record on a tape again, cover the tab hole with adhesive tape.

Safety tab

continued

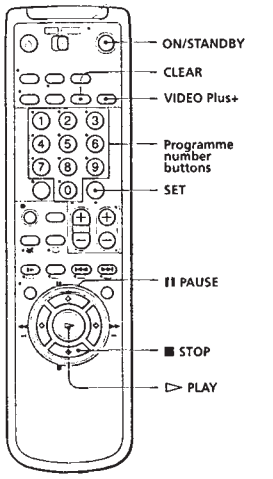
Tips

- To select a programme position, you can use the programme number buttons on the remote commander. For two-digit numbers, press the –/– – (ten's digit) button followed by the programme number buttons.
- You can select a video source from the LINE-1 (TV) or LINE-3 IN connector, or LINE-2 IN jacks using INPUT SELECT or PROG +/–. When you use PROG +/–, "L1," "L3" or "L2" appears in the display window between the lowest programme position and the highest one.
- The display appears on the TV screen indicating information about the tape, but the information won't be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV.

Notes

- The display does not appear during still (pause) mode or slow-motion playback.
- The display will not appear while playing an NTSC-recorded tape.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.
- When you insert a non-standard commercially available tape, the remaining time may not be correct.
- The remaining time doesn't work for an NTSC-recorded tape. "–:– –" appears in the display window.
- The remaining time is intended for rough measurement only.
- If you play back the tape for about 30 seconds after you have inserted it, the remaining time will be displayed.

Recording TV programmes using VIDEO Plus+

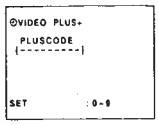


Just enter the programme's "PlusCode" listed in the TV programme guide. The date, times, and programme position of that programme are set automatically. You can preset up to eight programmes at a time.

Before you start...

- Check that the VCR clock is set to the correct time.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.

1 VIDEO Plus+ Press VIDEO Plus+.



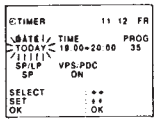
continued

2 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⓪ SET

Press the programme number buttons to enter the programme's PlusCode, then press SET.

If you make a mistake, press VIDEO Plus+ before pressing SET and re-enter the correct number.

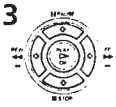
The date, start and stop times, programme position, tape speed, and the VPS/PDC function setting appear on the TV screen.



For details of the VPS/PDC function, see "Timer recording with VPS/PDC signals" on page 39.

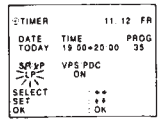
If the information is incorrect, press CLEAR to cancel the setting.

3



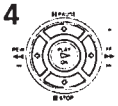
If you want to change the date, tape speed, and the VPS/PDC function setting:

1 Press ←/→ to flash the item you want to change.
2 Press ↑/↓ to reset it.



- To record the same programme every day or the same day every week, see "Daily/weekly recording" on page 39.
- To record from other source connected to the LINE-1 (TV) or LINE-3 IN connector, or LINE-2 IN jacks, press INPUT SELECT to display "L1", "L3", or "L2" in the "PROG" position.

4



Press OK to complete the setting.

5 ⏻ ON/STANDBY

Press ON/STANDBY to turn off the VCR.

The ⏻ indicator appears in the display window and the VCR stands by for recording.

To stop recording

To stop the VCR while recording, press ■ STOP.

Daily/weekly recording

In step 3 above, press ↓ to select the recording pattern. Each time you press ↓, the indication changes as shown below. Press ↑ to change the indication in reverse order.

TODAY → SU-SA (Sunday to Saturday) → MO-SA (Monday to Saturday) → MO-FR (Monday to Friday) → SA (every Saturday) ..... → MO (every Monday) → SU (every Sunday) → 1 month later → (dates count down) → TODAY

Timer recording with VPS/PDC signals

The broadcast systems transmit VPS (Video Programme System) or PDC (Programme Delivery Control) signals with their TV programmes. These signals ensure that your timer recordings are made regardless of broadcast delay, early starts or broadcast interruptions.

To use the VPS/PDC function, set VPS/PDC to ON. You can also use the VPS/PDC function for a source connected to the LINE-1(TV), LINE-3 IN connectors, and LINE-2 IN jacks.

To record satellite broadcasts

If you connect the satellite tuner and the VCR, you can record satellite programmes.

1 Turn on the satellite tuner.
2 On the satellite tuner, select the satellite programme for which you want to make a timer setting.
3 Keep the satellite tuner turned on until the VCR finishes recording the satellite programme for which you have made a timer setting.

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press ON/STANDBY. The ⏻ indicator turns off and the VCR switches on. Remember to press ON/STANDBY to reset the VCR after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV programme.

continued

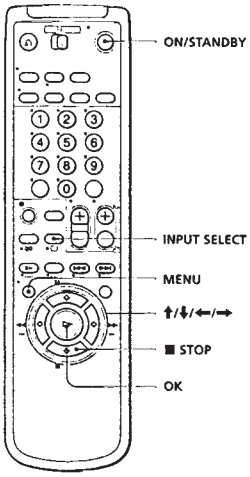
Tips

- To set the tape speed, you can also use the SP/LP button.
- When you are recording a progamme in the SP mode and the remaining tape becomes shorter than the recording time, the tape speed is automatically changed to the LP mode. Note that some interference will appear on the picture at the point the tape speed is changed. If you want to keep the same tape speed, set AUTO TAPE SPEED to OFF in the TAPE OPTIONS menu (page 52).

Note

- If the PlusCode is incorrect, the VIDEO Plus+ menu appears instead of the TIMER menu after pressing SET.

Setting the timer manually

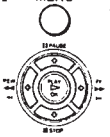


If VIDEO Plus+ is not available in you area, follow the instructions below to set the timer to record programmes.

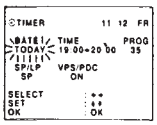
Before you start...

- Check that the VCR clock is set to the correct time.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and set it to the video channel.
- To record from a decoder, turn it on.

1 • MENU

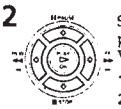


Press MENU, then press ↑/↓ to select TIMER and press OK.



continued

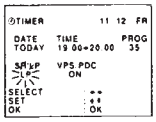
2



Set the date, start and stop times, programme position, tape speed and VPS/PDC function:

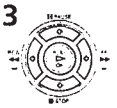
1 Press ← / → to flash each item in turn.
2 Press ↑ / ↓ to set each item.

To correct a setting, press ← to return to that setting and reset.



- To record the same programme every day or the same day every week, see "Daily/weekly recording" on page 43.
- To use the VPS/PDC function, see "Timer recording with VPS/PDC signals" on page 43.
- To record from other source connected to the LINE-1 (TV) or LINE-3 IN connector, or LINE-2 IN jacks, press INPUT SELECT to display "L1", "L3", or "L2" in the "PROG" position.

3



Press OK.

4

Press ON/STANDBY to turn off the VCR.

The ⏻ indicator appears in the display window and the VCR stands by for recording.

To record from a source, leave the connected equipment switched on.

To stop recording

To stop the VCR while recording, press ■ STOP.

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press ON/STANDBY. The ⏻ indicator turns off and the VCR switches on. Remember to press ON/STANDBY to reset the VCR after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV programme.

Daily/weekly recording

In step 2 above, press ↓ to select the recording pattern. Each time you press ↓, the indication changes as shown below. Press ↑ to change the indication in reverse order.

TODAY → SU-SA (Sunday to Saturday) → MO-SA (Monday to Saturday) → MO-FR (Monday to Friday) → SA (every Saturday) ..... → MO (every Monday) → SU (every Sunday) → 1 month later → (dates count down) → TODAY

Timer recording with VPS/PDC signals

The broadcast systems transmit VPS (Video Programme System) or PDC (Programme Delivery Control) signals with their TV programmes. These signals ensure that your timer recordings are made regardless of broadcast delay, early starts or broadcast interruptions.

To use the VPS/PDC function, set VPS/PDC to ON. You can also use the VPS/PDC function for a source connected to the LINE-1(TV), LINE-3 IN connectors, and LINE-2 IN jacks.

Tips

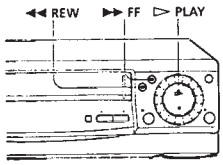
- To set the programme position, you can also use the PROG +/– or programme number buttons.
- To set the tape speed, you can also use the SP/LP button.
- When you are recording a progamme in the SP mode and the remaining tape becomes shorter than the recording time, the tape speed is automatically changed to the LP mode. Note that some interference will appear on the picture at the point the tape speed is changed. If you want to keep the same tape speed, set AUTO TAPE SPEED to OFF in the TAPE OPTIONS menu (page 52).

Notes

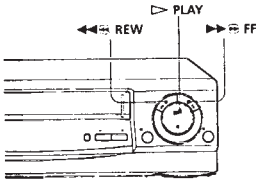
- When setting the timer with VPS/PDC signals, enter the start and stop times exactly as indicated in the TV programme guide, otherwise the VPS/PDC function won't work.
- If the VPS/PDC signal is too weak or the broadcasting station failed to transmit VPS/PDC signals, the VCR will start recording at the set time without using the VPS/PDC function.
- The ⏻ indicator flashes in the display window when you press ON/STANDBY with no tape inserted.

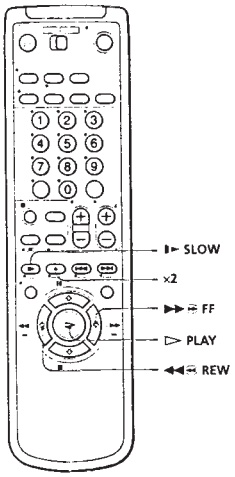
Playing/searching at various speeds

SLV-E530UX



SLV-E295UX



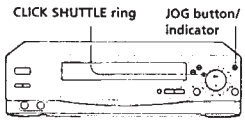


Playback options	Operation
View the picture during fast-forward or rewind	During fast-forward, hold down ▶▶ FF or ▶▶ FF. During rewind, hold down ◀◀ REW or ◀◀ REW.
Play at high speed	• During playback, press ▶▶ FF or ◀◀ REW. • During playback, hold down ▶▶ FF or ◀◀ REW. To resume normal playback, release the button.
Play at twice the normal speed	During playback, press x2.
Play in slow motion	During playback or pause, press I▸ SLOW.
Play frame by frame	During pause, press ▶▶ FF or ◀◀ REW. Hold down the button to play one frame each second.
Rewind and start play	During stop, press ▷ PLAY on the VCR while holding down ◀◀ REW or ◀◀ REW on the VCR.

To resume normal playback

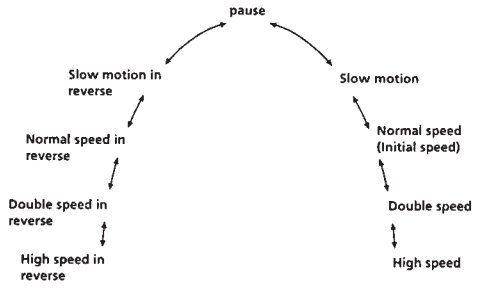
Press ▷ PLAY.

Using the CLICK SHUTTLE ring (SLV-E530UX only)



With the CLICK SHUTTLE ring, you can operate a variety of playback options.

During playback or pause, turn the CLICK SHUTTLE ring clockwise or counterclockwise. Each change in the CLICK SHUTTLE ring position changes the playback mode in the following way.



To use the CLICK SHUTTLE ring in jog mode

Use this mode for frame-by-frame play back.

Press JOG to enter the jog mode. The JOG button/indicator lights up. If you change to jog mode during any playback mode, playback pauses so you can see a still picture. Each change in the CLICK SHUTTLE ring position shifts the picture one frame. To shift frames in reverse, turn the CLICK SHUTTLE ring counterclockwise. The frame shift speed depends on the speed you turn the CLICK SHUTTLE ring. To cancel the jog mode, press JOG again. The JOG indicator goes off and the VCR enters the pause mode.

continued

Playing/searching at various speeds (continued)

Tip

- Adjust the picture using the TRACKING +/– buttons on the VCR if:
  - streaks appear while playing in slow motion
  - the picture shakes while pausing.

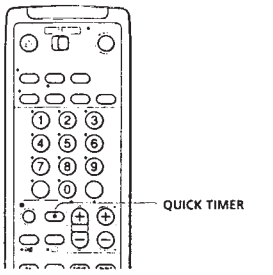
  To set tracking to the centre position, press both buttons (+/–) at the same time.

Notes

- The sound is muted during these operations.
- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- The picture may shake, be distorted or discoloured during the various playback operations.

Recording TV programmes using the quick timer

After starting recording in the normal way, you can have the VCR stop recording automatically after a specified duration.



1 While recording, press QUICK TIMER once.

The ◴ indicator appears in the display window.

2 Press QUICK TIMER repeatedly to set the duration.

Each press advances the time in increments of 30 minutes.

0:00 → 0:30 → 1:00 ·····→ 10:30 → 11:00

The duration decreases minute by minute to 0:00, then the VCR stops recording and turns off automatically.

To extend the duration

Press QUICK TIMER repeatedly to set to the new duration.

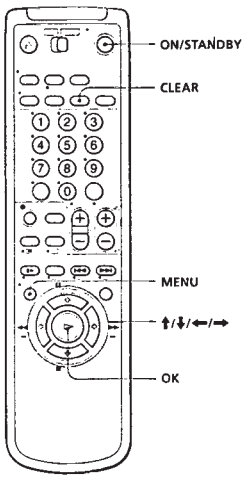
To stop recording

To stop the VCR while recording, press ■ STOP.

Using the quick timer during stop mode

You can set the quick timer and start recording during stop mode by pressing QUICK TIMER. To set the channel, you can use the PROG +/– or INPUT SELECT buttons. Press QUICK TIMER repeatedly to set the recording duration. The recording will start automatically.

Checking/ changing/ cancelling timer settings



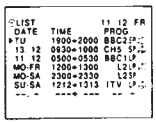
Before you start...

- Turn on your TV and set it to the video channel.

1 Press ON/STANDBY to turn on the VCR.

2 Press MENU, then press ↑/↓ to select LIST and press OK:

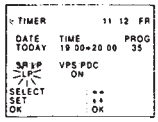
- If you want to change a setting, go on to the next step.
- If you do not need to change the settings, press OK, then turn off the VCR to return to recording standby.



3 Press ↑/↓ to select the setting you want to change or cancel, then press OK.

4 • To change the setting, press ←/→ to flash the item you want to change, and press ↑/↓ to reset it.

• To cancel the setting, press CLEAR.



5 Press OK.

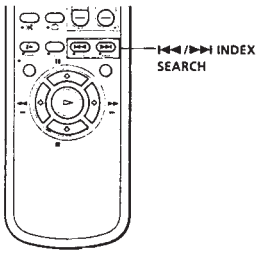
If any settings remain, turn off the VCR to return to recording standby.

When the timer settings overlap

The programme that starts first has priority and the second programme starts recording only after the first programme has finished. If the programmes start at the same time, the programme listed first in the menu has priority.

Searching using the index function

The VCR marks the tape with an index signal at the point where each recording begins. Use these signals as references to find a specific recording.



1 Insert an indexed tape into the VCR.

2 Press ⏮/⏭ INDEX SEARCH.

- To search ahead, press ⏭ INDEX SEARCH.
- To search backwards, press ⏮ INDEX SEARCH.

The VCR starts searching. Playback starts automatically from that point.

To stop searching

Press ■ STOP.

Note

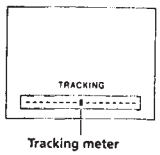
- No index signal will be added when recording starts from recording pause. However, an index signal will be marked if you change the programme position during recording pause.

Adjusting the picture

Adjusting the tracking

Although the VCR automatically adjusts the tracking when playing a tape (the ⊠ indicator flashes in the display window, then goes off), distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking.

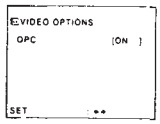
During playback, press the TRACKING +/– buttons on the VCR to display the tracking meter. The distortion should disappear as you press one of the two buttons. (The ⊠ indicator lights up.) To resume automatic tracking adjustment eject the tape and restart it.



Tracking meter

About Optimum Picture Control (OPC)

Optimum Picture Control (OPC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you set OPC to ON in the VIDEO OPTIONS menu (with the OPC indicator in the display window lit). For details, see page 52.



OPC playback

The OPC function automatically works on all types of tapes, including rental tapes and tapes that were not recorded with OPC.

OPC recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the OPC function (the OPC indicator flashes rapidly). This adjustment is retained until the tape is ejected.

To deactivate the OPC

Press MENU and select SETTINGS, OPTIONS, VIDEO OPTIONS then set OPC to OFF. The OPC indicator in the display window goes off.

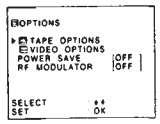
Note

- There is a delay of a few seconds before the VCR actually starts recording while the VCR analyses the tape. To avoid the delay, first set the VCR to recording pause (the OPC indicator flashes slowly) and press ● REC to have the VCR analyse the tape. After the OPC indicator stops flashing, press ❚❚ PAUSE to start recording immediately. If you press ❚❚ PAUSE before the OPC indicator stops flashing, the OPC function is cancelled.

Changing menu options

1 Press MENU, then press ↑/↓ to select SETTINGS and press OK.

2 Press ↑/↓ to select OPTIONS, then press OK.



3 Press ↑/↓ to select the option you want to change:
- To change the TAPE OPTIONS or VIDEO OPTIONS
  1 Press OK after selecting TAPE OPTIONS or VIDEO OPTIONS.
  2 Press ↑/↓ to select the option, then press ←/→ to change the setting.
- To change the other options
  Press ←/→ to change the setting.

4 Press OK to return to the original screen.

Menu choices

Initial settings are indicated in bold print.

TAPE OPTIONS

Menu option	Set this option to
AUTO TAPE SPEED	• **ON** to change the timer recording tape speed automatically to the LP mode when the remaining tape becomes shorter than the recording time. • **OFF** to keep the set tape speed.
TAPE SELECT	• **300** to use an E-300 type tape. • **240** to use an E-240 type tape. • **195** to use an E-195 or shorter type tape.

VIDEO OPTIONS

Menu option	Set this option to
OPC	• **ON** to switch on the OPC (Optimum Picture Control) function and improve picture quality. • OFF to switch off OPC.

Other options

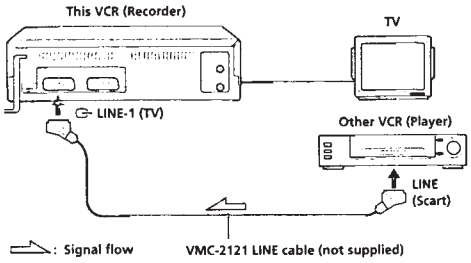
Menu option	Set this option to
POWER SAVE	• **OFF** to turn on the indicators in the display window while the VCR is standing by. • ON to turn off the indicators in the display window to conserve the VCR power.
RF MODULATOR	• **ON** if you connect the VCR to your TV using only the aerial cable. • OFF if you connect the VCR to your TV using the EURO-AV cable.

Note

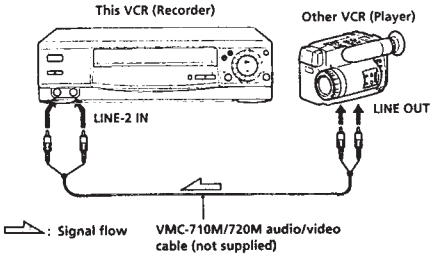
- When you set a timer recording, the indicators in the display window are on even though POWER SAVE is set to ON.

Editing with another VCR

Connecting to record on this VCR



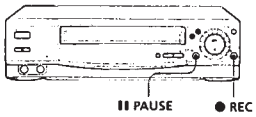
You can connect to the jacks on the front panel.



Notes

- Make sure you connect the plugs to jacks of the same colour.
- If you connect this VCR to both the LINE IN and LINE OUT jacks of the other VCR, select the input correctly to prevent a humming noise.

Operation (when recording on this VCR)



Before you start editing

- Turn on your TV and set it to the video channel.
- Press INPUT SELECT to display "L1" (or "L2" or "L3") in the display window.
- Press SP/LP to select the tape speed, SP or LP.

1 Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.

2 Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press II PAUSE.

3 Press ● REC on this VCR and set it to recording pause.

4 To start editing, press the II PAUSE buttons on both VCRs at the same time.

To stop editing

Press the ■ STOP buttons on both VCRs.

Tips

- To edit more precisely, press the II PAUSE buttons on the VCRs to release pause.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording (Assemble Editing).

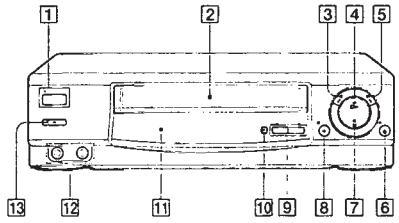
Note

- If you start recording following the procedure above, the VCR won't start recording with the OPC function. To record a tape with the OPC function, press ● REC again during recording pause in step 3 so that the VCR analyses the tape. Then, when you start editing in step 4, press II PAUSE after the OPC indicator stops flashing. If you press II PAUSE before the OPC indicator stops flashing, the OPC function is cancelled.

Index to parts and controls

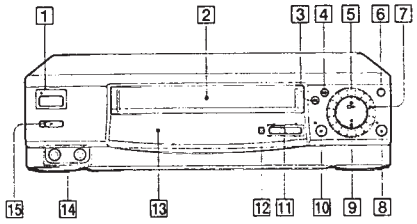
Refer to the pages indicated in parentheses ( ) for details.

Front panel (SLV-E295UX)



1 ON/STANDBY switch/indicator (38)
2 Tape compartment
3 ◀◀ REW (rewind) button (31, 44)
4 ▷ PLAY button (30)
5 ▶▶ FF (fast-forward) button (31, 44)
6 ● REC (record) button (34)
7 ■ STOP button (34)
8 ❚❚ PAUSE button (31)
9 PROGRAM/TRACKING +/− buttons (34, 51)
10 AUTO SET UP/RF (Radio Frequency) CHANNEL button (11, 13)
11 Remote sensor (5)
12 LINE-2 IN VIDEO/AUDIO jacks (54)
13 ⏏ EJECT button (31)

Front panel (SLV-E530UX)

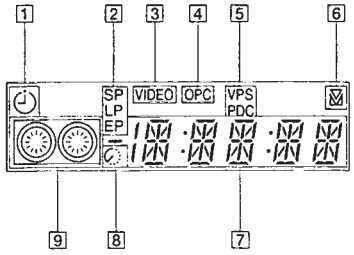


1 ON/STANDBY switch/indicator (38)
2 Tape compartment
3 ◀◀ REW (rewind) button (31, 44)
4 ▶▶ FF (fast-forward) button (31, 44)
5 ▷ PLAY button (30)
6 JOG button/indicator (45)
7 CLICK SHUTTLE ring (45)
8 ● REC (record) button (34)
9 ■ STOP button (34)
10 ❚❚ PAUSE button (31)
11 PROGRAM/TRACKING +/− buttons (34, 51)
12 AUTO SET UP/RF (Radio Frequency) CHANNEL button (11, 13)
13 Remote sensor (5)
14 LINE-2 IN VIDEO/AUDIO jacks (54)
15 ⏏ EJECT button (31)

continued

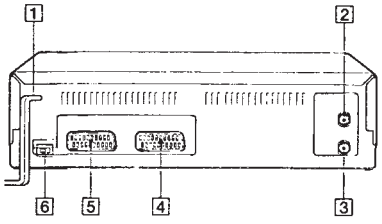
Index to parts and controls (continued)

Display window



1 Timer indicator (38)
2 Tape speed indicators (34)
3 VIDEO indicator (35)
4 OPC (Optimum Picture Control) indicator (51)
5 VPS/PDC (Video Programme System/Programme Delivery Control) indicator (39, 43)
6 Tracking indicator (51)
7 Time counter/clock/line/programme position indicator (31, 34, 55)
8 Remaining time indicator (35)
9 Tape/recording indicator (34)

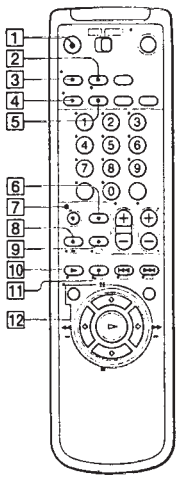
Rear panel



1 Mains lead (9)
2 AERIAL IN ANTENNE ENTREE connector (9)
3 AERIAL OUT ANTENNE SORTIE connector (9)
4 LINE-3 IN ENTREE LIGNE-3 connector
5 LINE-1 (TV) LIGNE-1 (TV) connector (10, 54)
6 NTSC PB (PlayBack) switch (31)

continued

Remote commander



1 ⏏ EJECT button (31)

2 COUNTER RESET button (31)

3 DISPLAY button (31)

4 WIDE button (*for TV*) (6)

5 TV/VIDEO button (35)

6 QUICK TIMER button (47)

7 ● REC (record) button (34)

8 SP (Standard Play)/LP (Long Play) button (34)
(Teletext) button (*for TV*) (6)

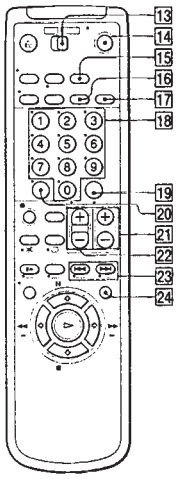
9 INPUT SELECT button (33, 42)
TV power on/TV mode select button (*for TV*) (6)

10 SLOW button* (44)

11 ×2 button* (44)

12 Tape/menu operatin buttons

MENU button (14, 52)
❚❚ PAUSE/↑ button (31)
■ STOP/↓ button (34)
◀◀ REW (rewind)/← button (31, 44)
▶▶ FF (fast-forward)/→ button (31, 44)
▷ PLAY/OK button (30)



13 TV/VIDEO remote control switch (5)

14 ON/STANDBY switch (38)

15 COUNTER/REMAIN button (35)

16 CLEAR button (49)

17 VIDEO Plus+ button (37)

18 Programme number buttons (24, 38)

19 SET button (38)

20 -/-- (ten's digit) button (36)

21 PROG (programme) +/– buttons (34)
/ Teletext page access buttons (*for TV*) (6)

22 VOL (volume) +/– buttons (*for TV*) (6)

23 ⏮/⏭ INDEX SEARCH buttons* (50)

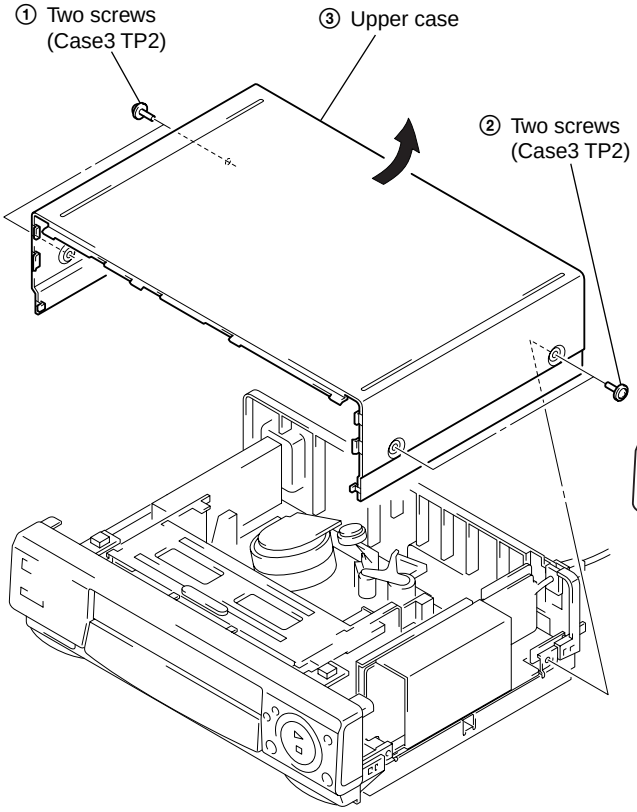
24 REPLAY button (31)

* FASTEXT buttons (*for TV*)

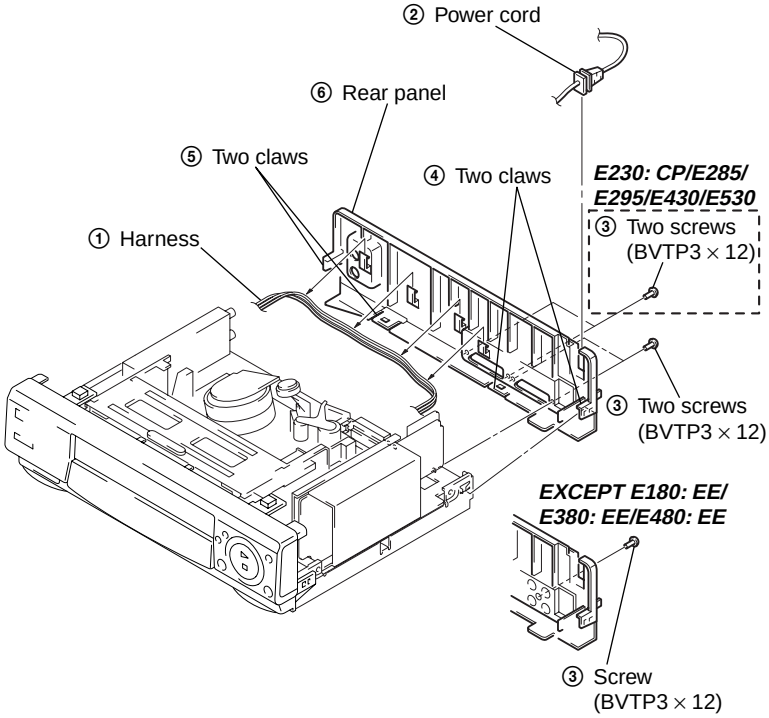
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

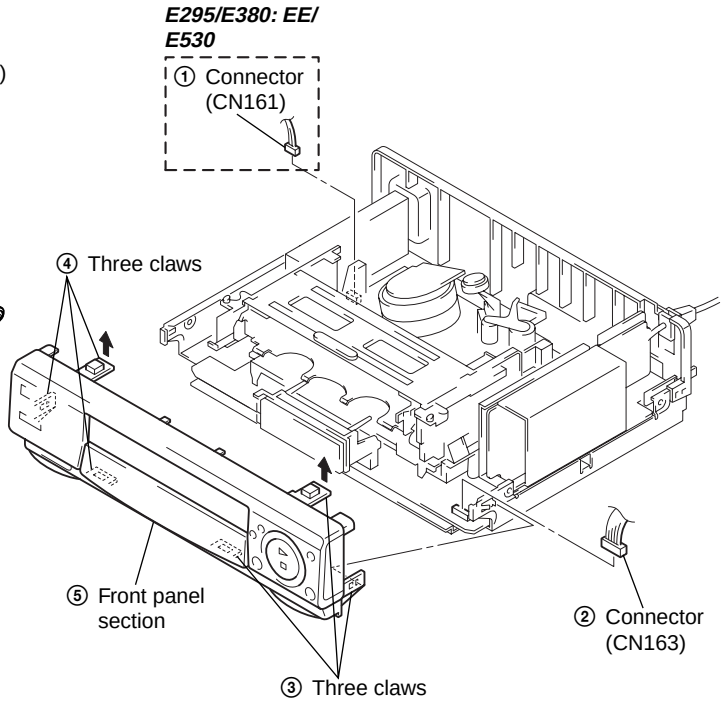
2-1. UPPER CASE REMOVAL



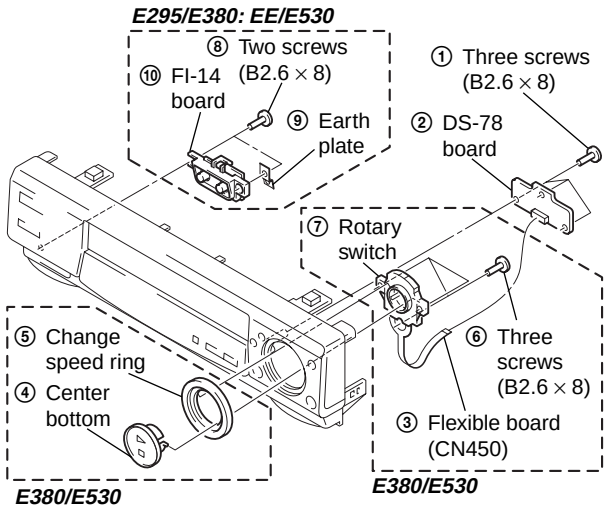
2-2. REAR PANEL REMOVAL



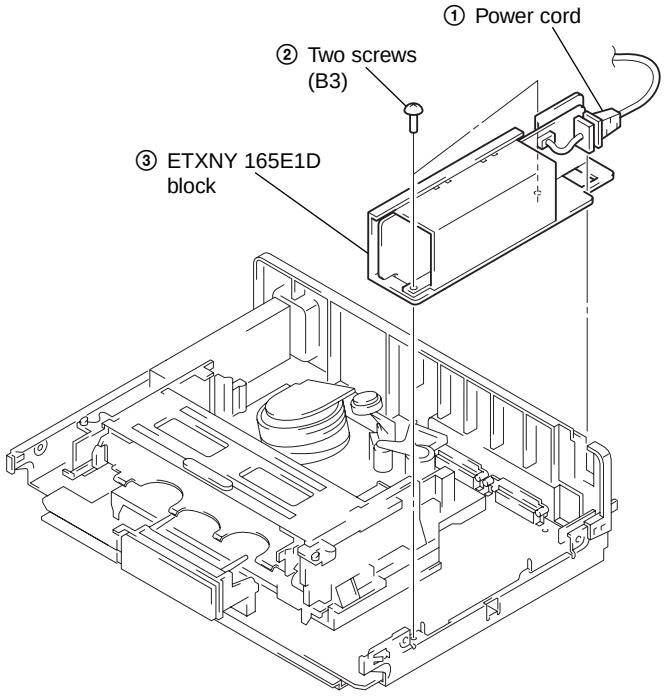
2-3. FRONT PANEL SECTION REMOVAL



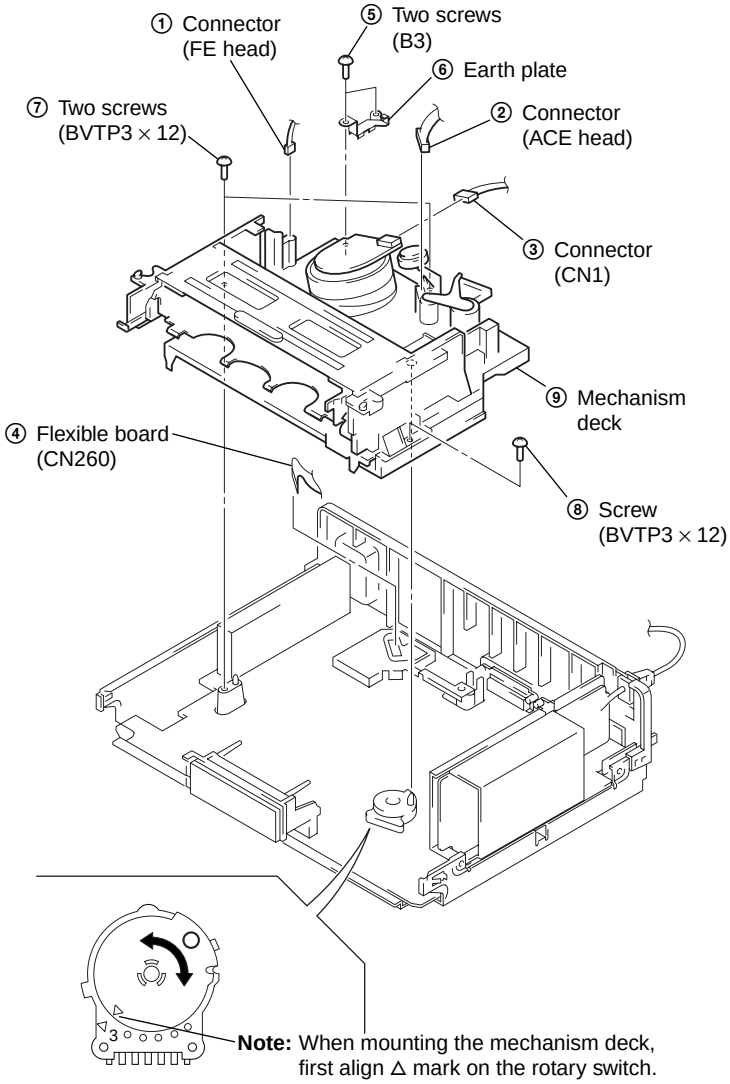
2-4. DS-78, FI-14 BOARD REMOVAL



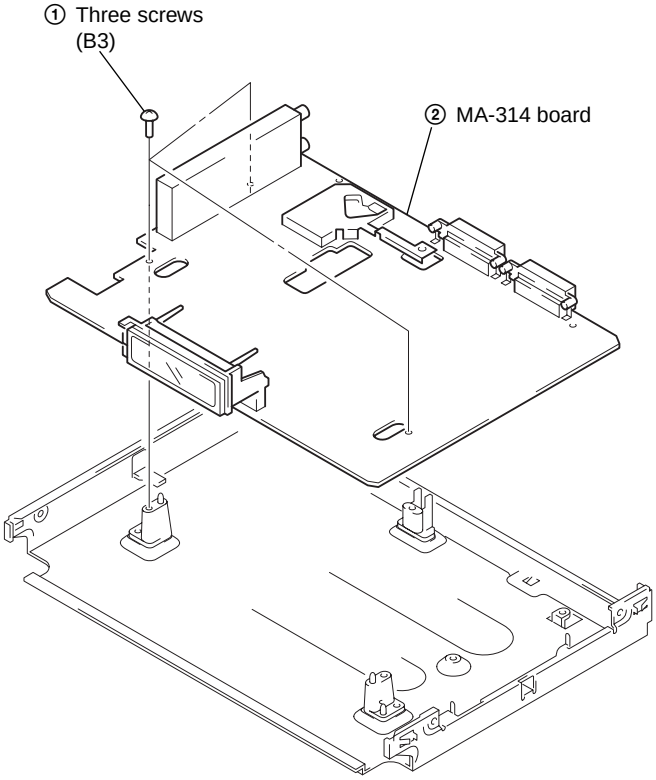
2-5. ETXNY 165E1D BLOCK REMOVAL



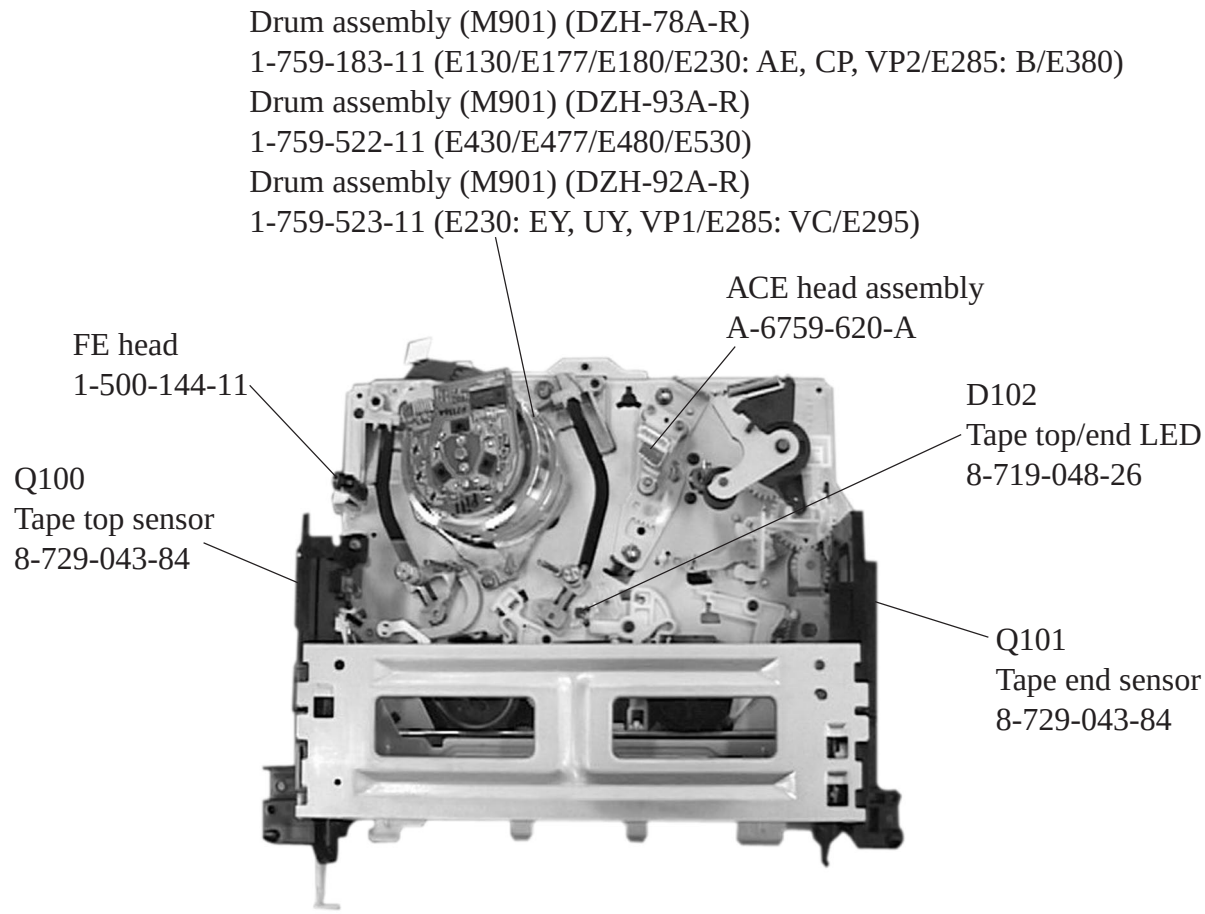
2-6. MECHANISM DECK REMOVAL

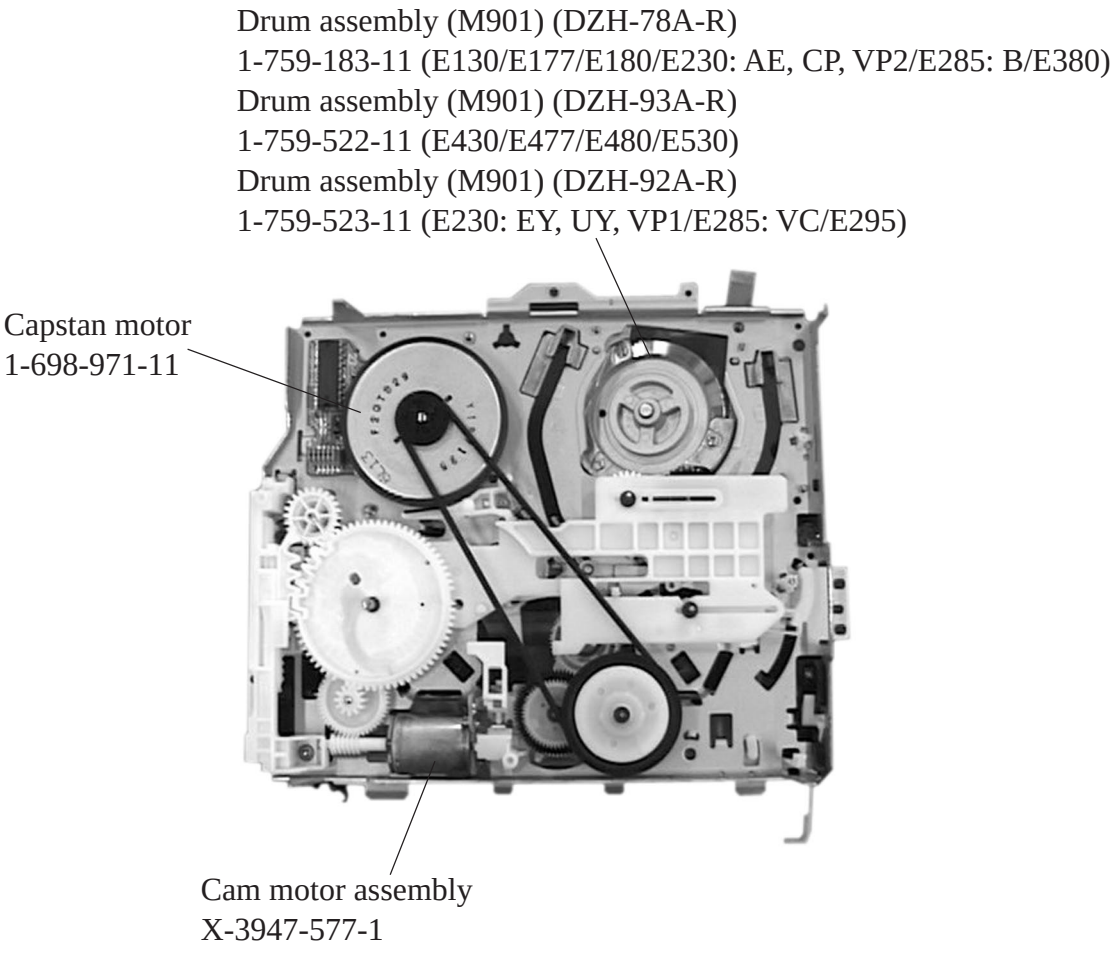


2-7. MA-314 BOARD REMOVAL

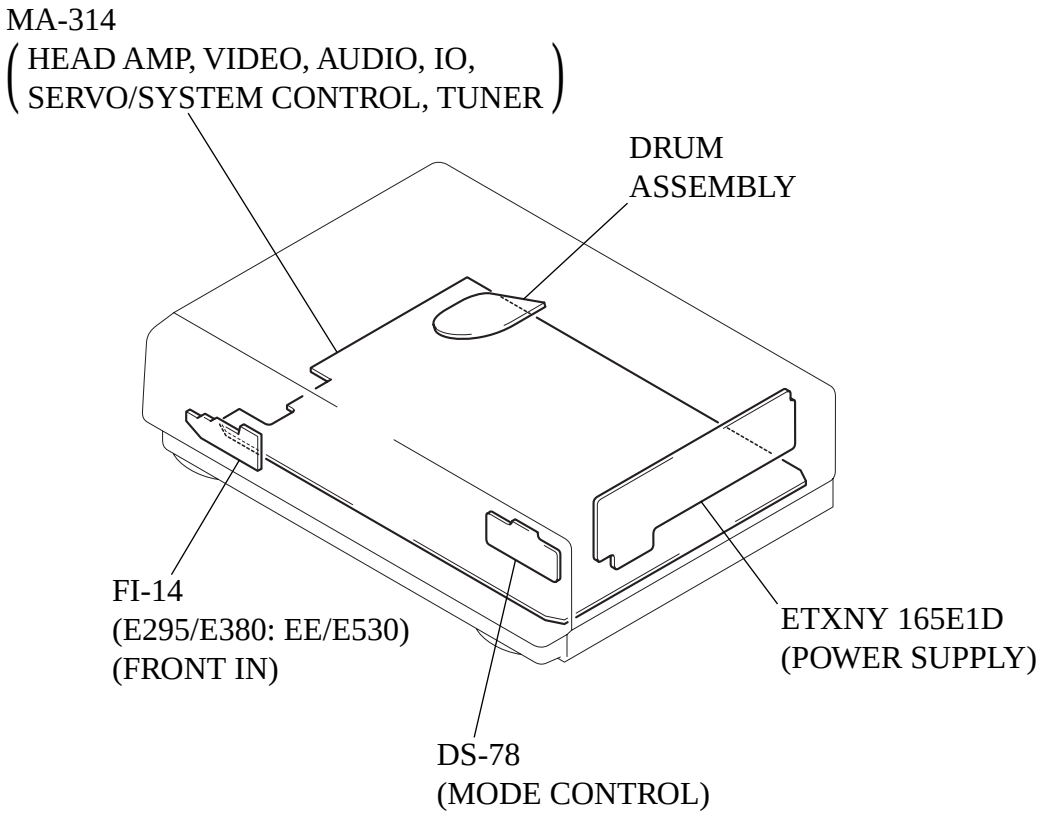


2-8. INTERNAL VIEWS



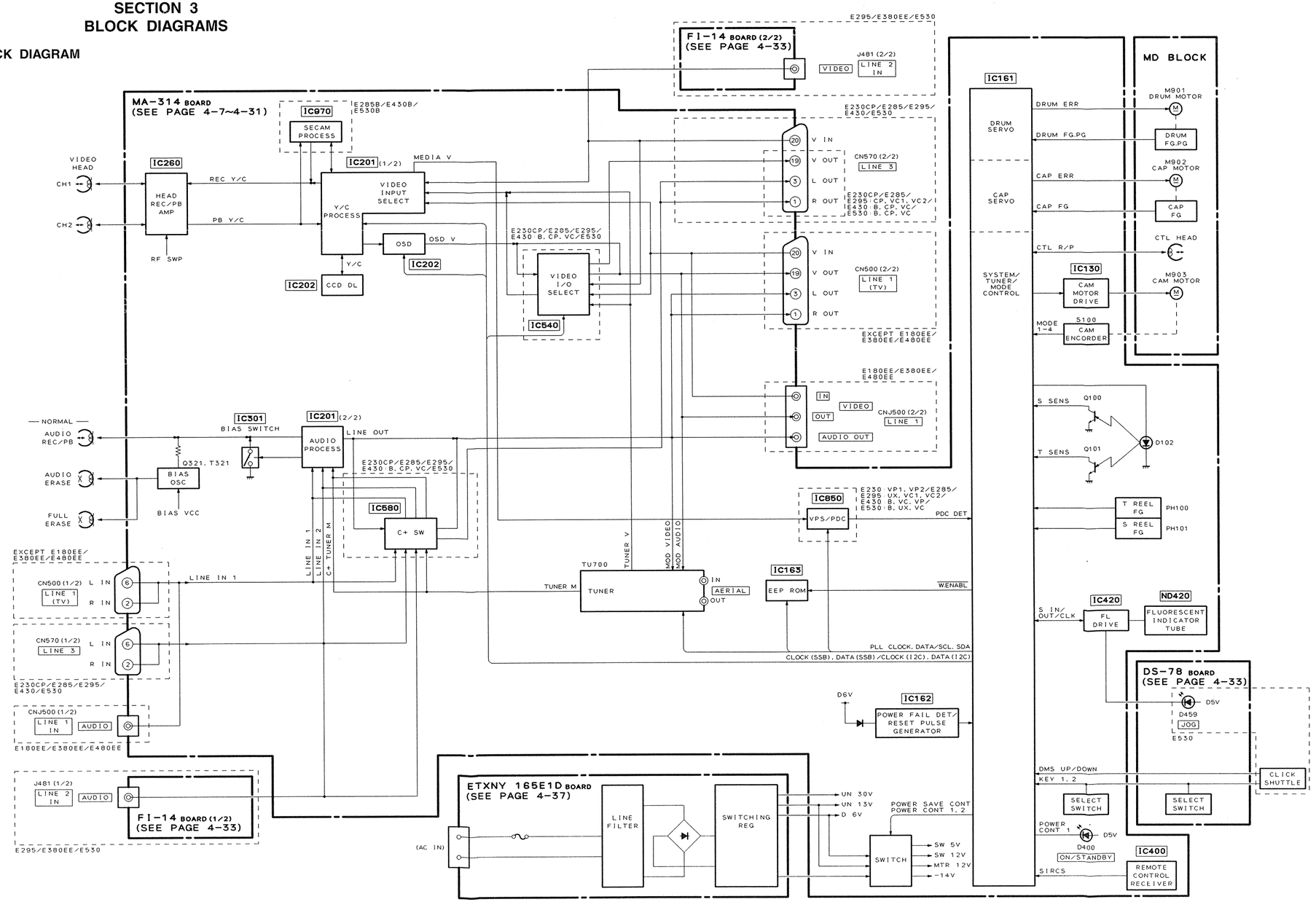


2-9. CIRCUIT BOARDS LOCATION

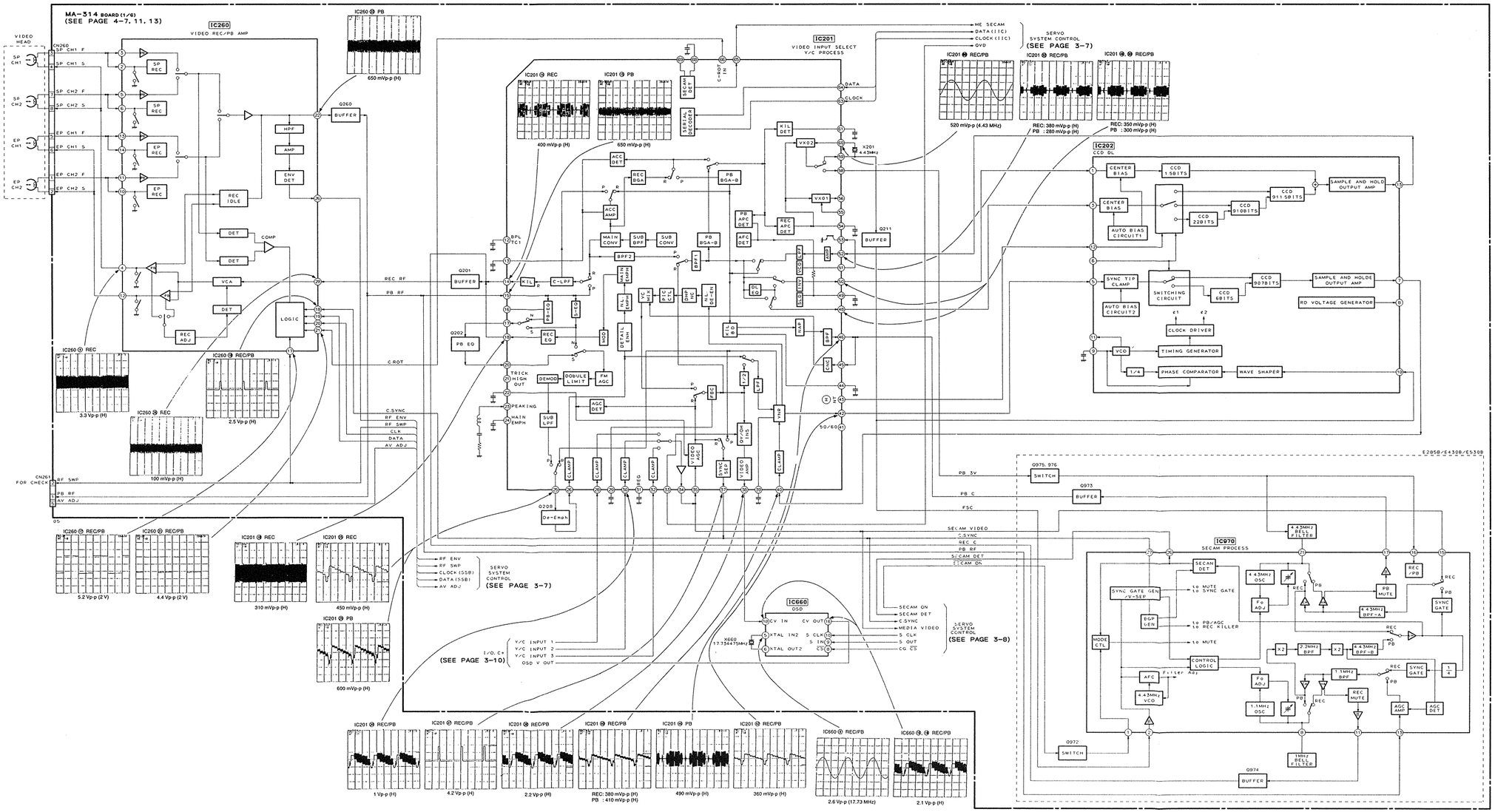


SECTION 3
BLOCK DIAGRAMS

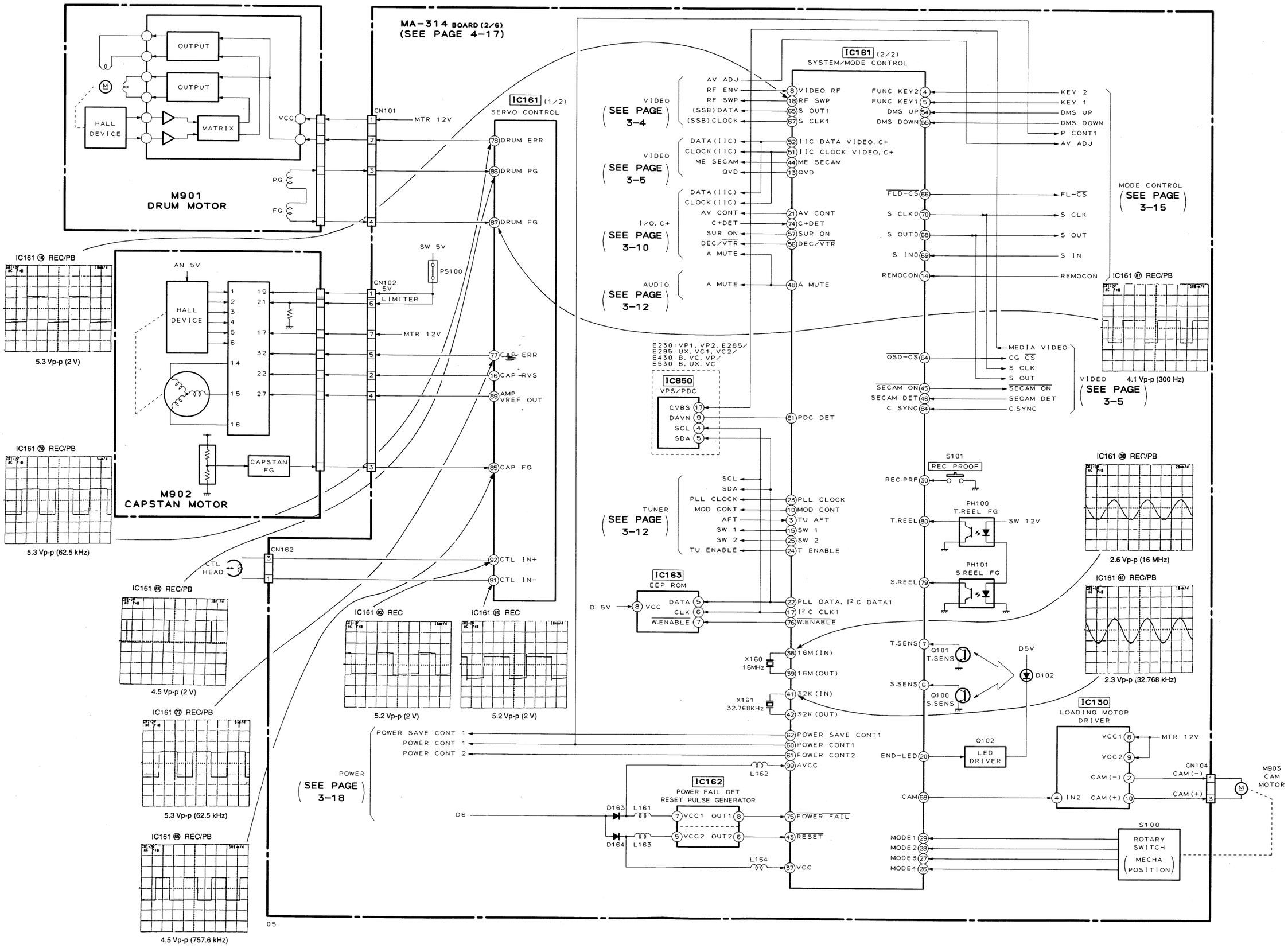
3-1. OVERALL BLOCK DIAGRAM



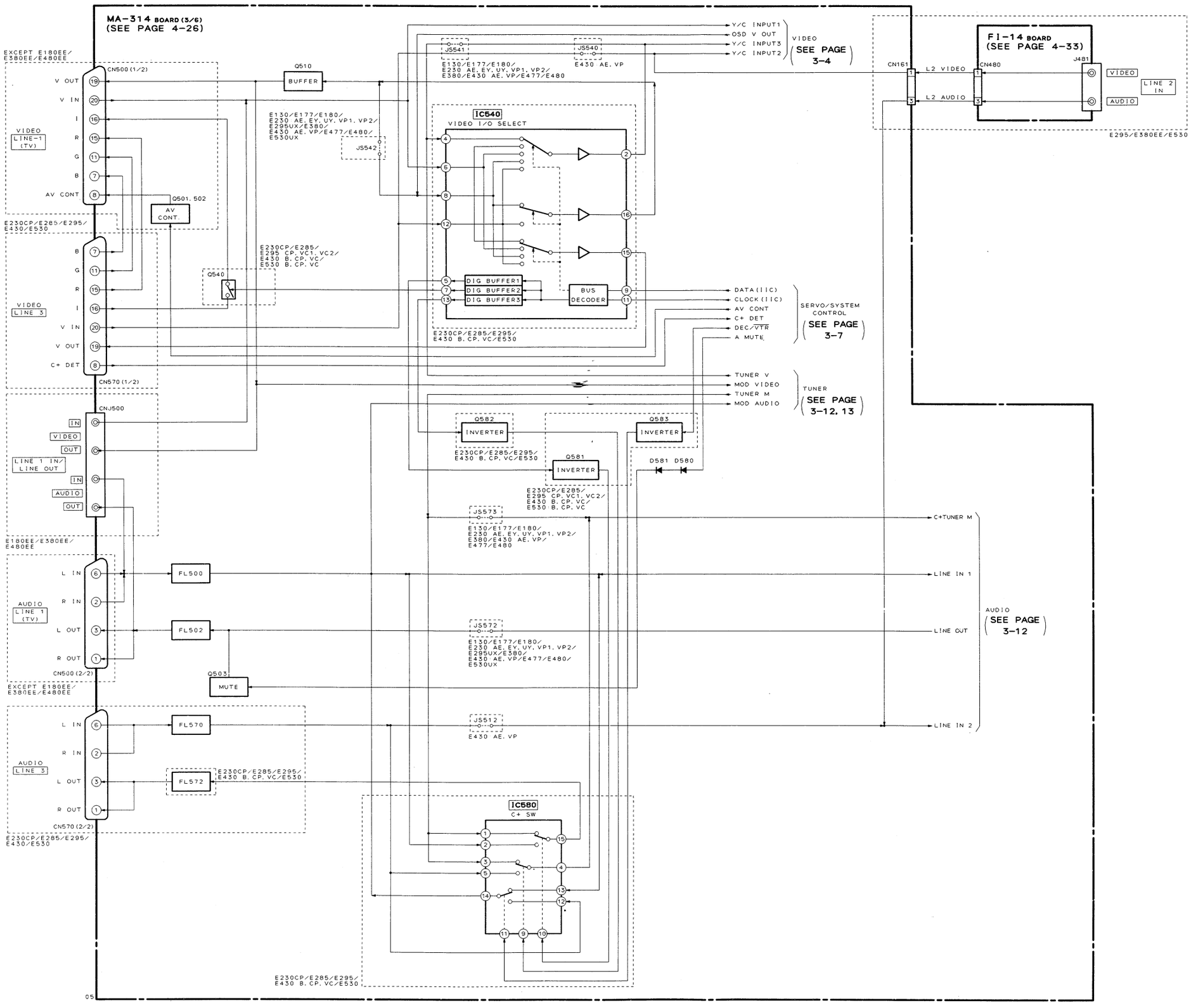
3-2. VIDEO BLOCK DIAGRAM



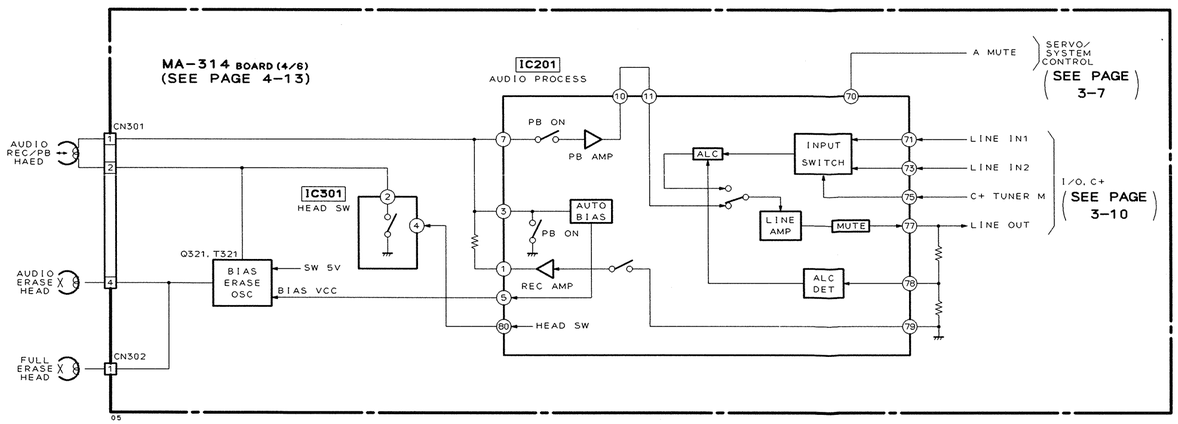
3-3. SERVO/SYSTEM CONTROL BLOCK DIAGRAM



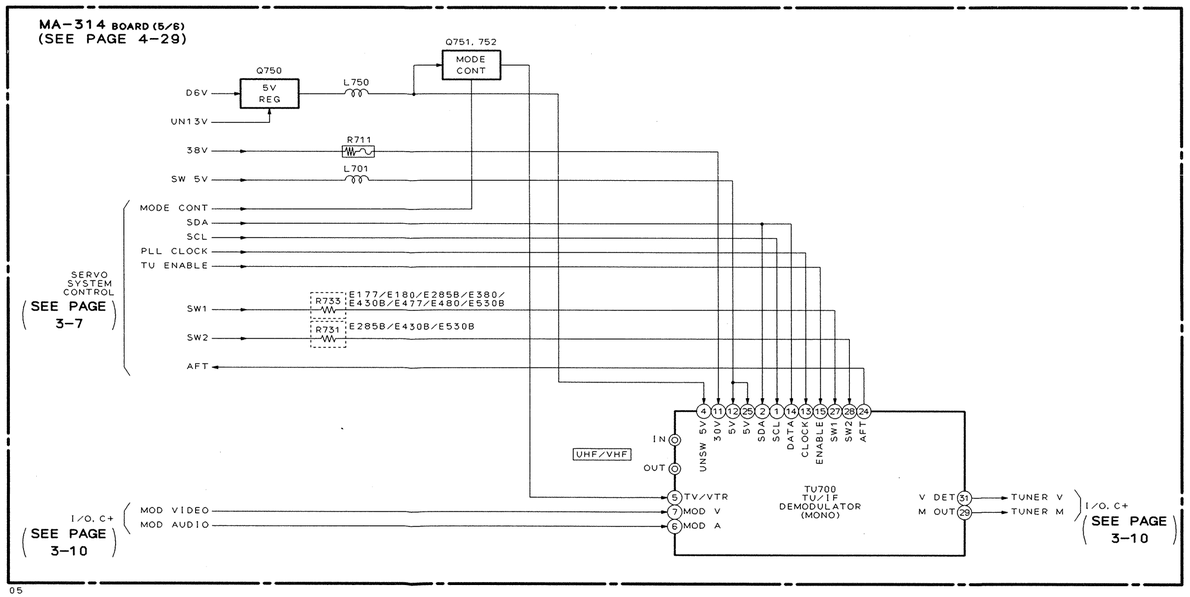
3-4. I/O, C+ BLOCK DIAGRAM



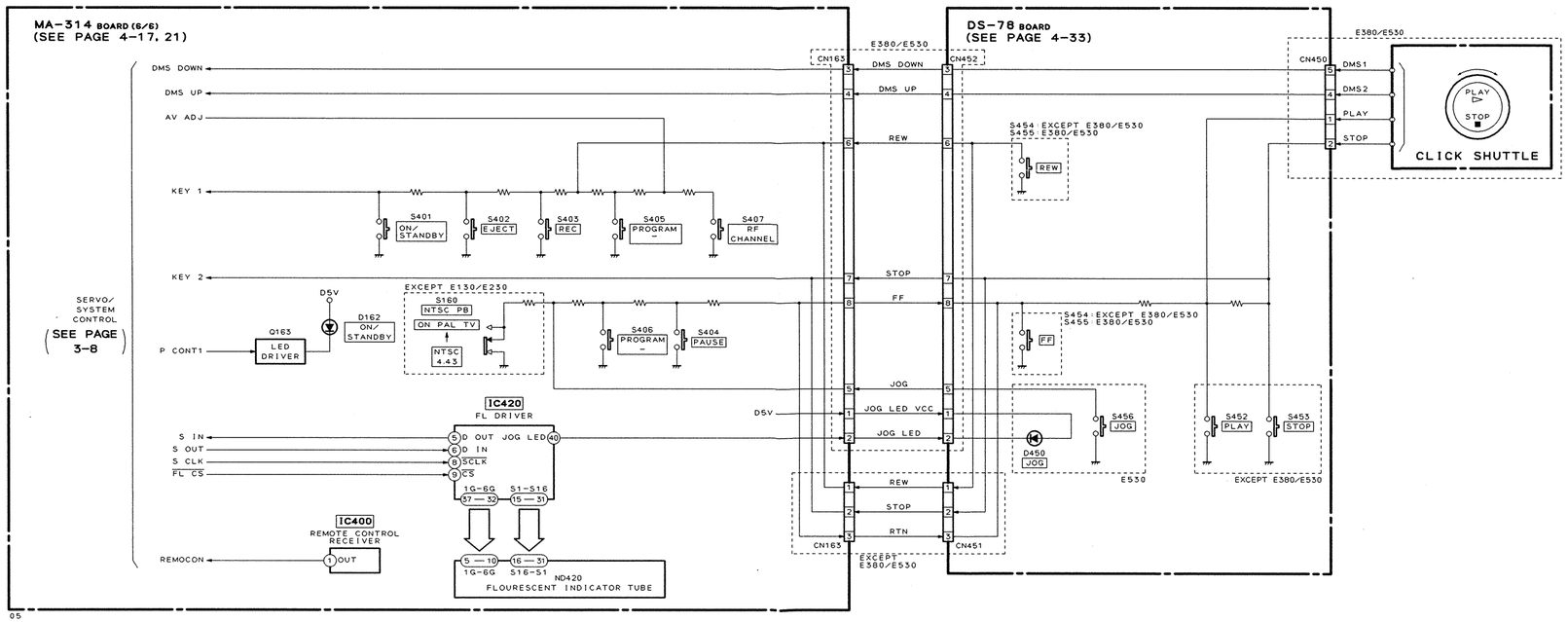
3-5. AUDIO BLOCK DIAGRAM



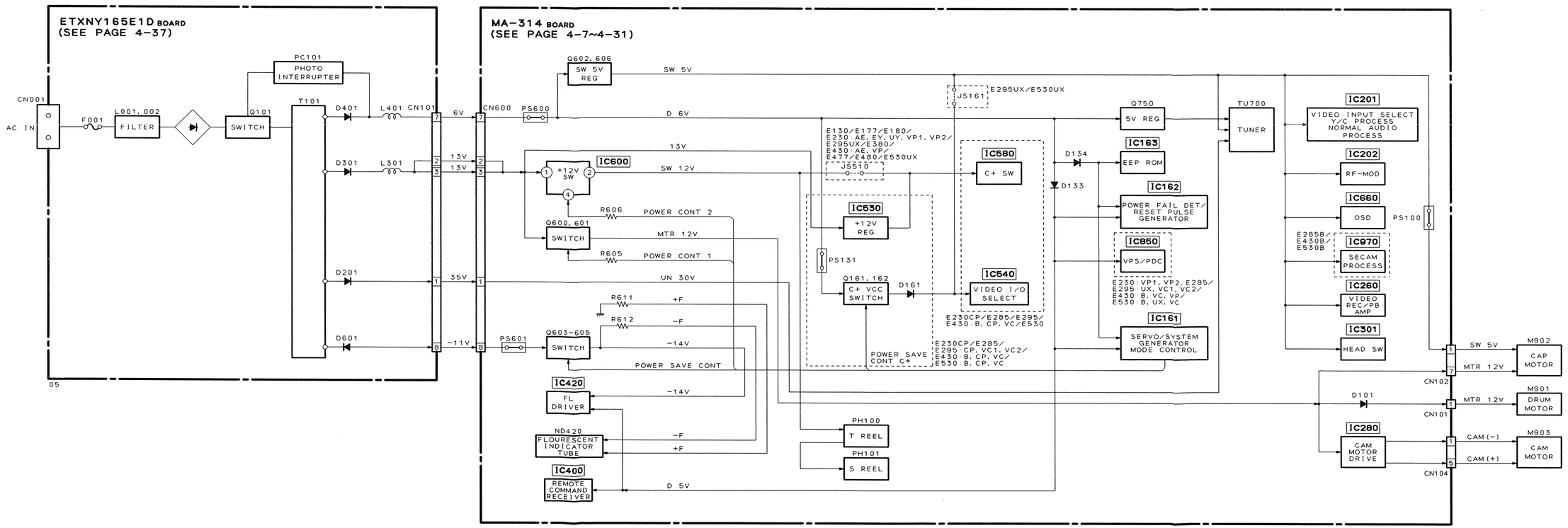
3-6. TUNER BLOCK DIAGRAM



3-7. MODE CONTROL BLOCK DIAGRAM



3-8. POWER BLOCK DIAGRAM



SECTION 4
PRINTED WIRED BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS. (In addition to this, the necessary mote is printed in each block.)

For printed wiring boards:

- ○—— : indicates a lead wire mounted on the component side.
- ●—— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▒ : Pattern from the side which enables seeing.
- ▒ : Pattern on the rear side.*
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

For schematic Diagram:

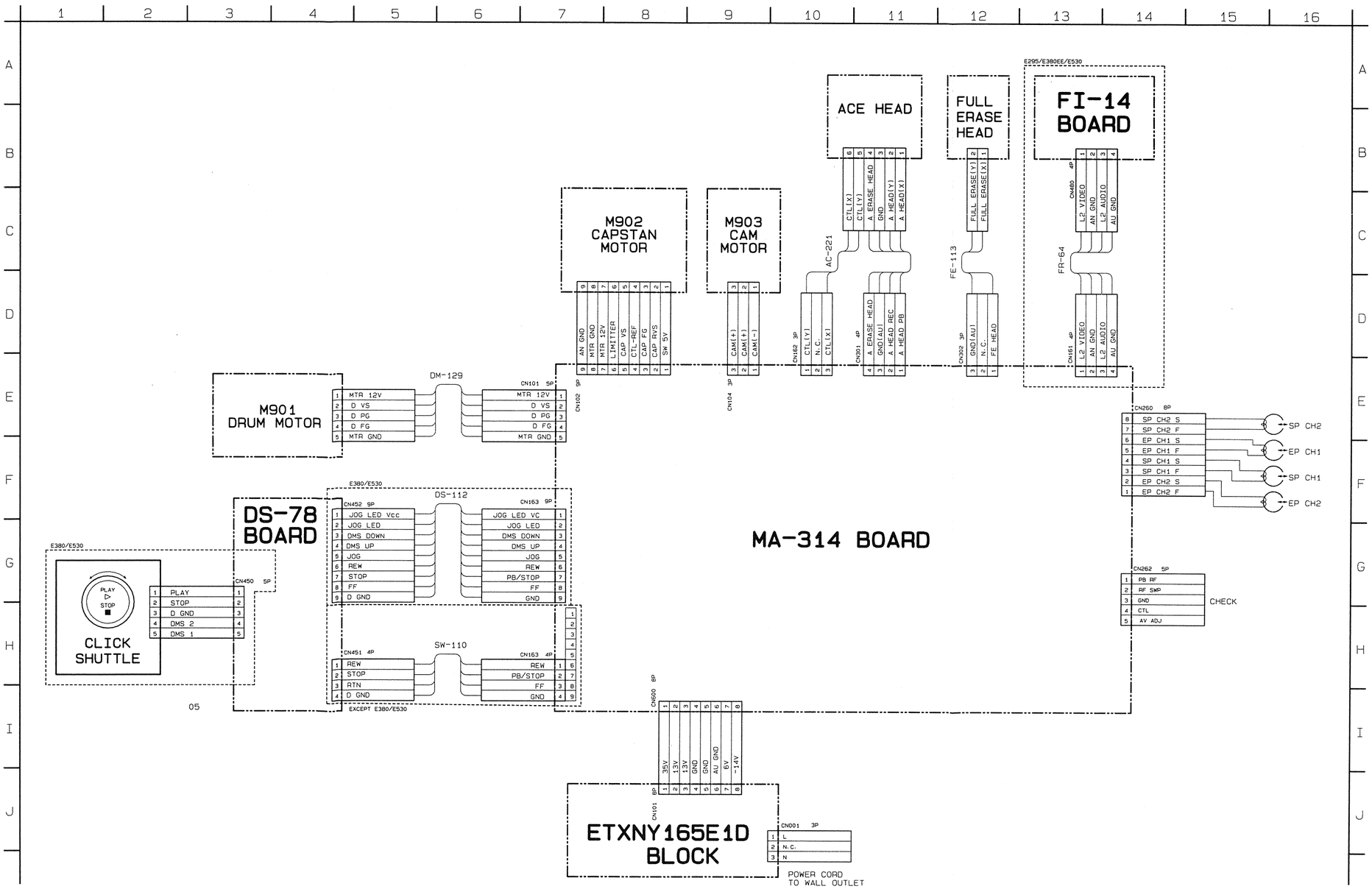
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4 W (Chip resistors : 1/10 W) unless otherwise specified. kΩ : 1000Ω, MW : 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.*
- : B+ Line.*
- : B– Line.*
- : IN/OUT direction of B line (+, –).*
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC 10MW).*
- Voltage variations may be noted due to normal production tolerances.*

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- * : indicated by the color red.

4-1. FRAME SCHEMATIC DIAGRAM

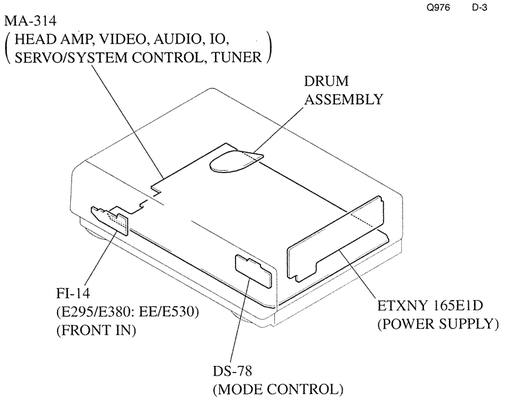


FRAME

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

MA-314 BOARD

CN101	F-12	IC130	I-4
CN102	E-3	IC161	H-10
CN104	H-6	IC162	G-8
CN161	E-12	IC163	G-9
CN162	I-12	IC201	D-7
CN163	I-1	IC202	D-5
CN260	B-10	IC260	B-10
CN262	A-10	IC301	B-9
CN301	B-9	IC400	J-9
CN302	B-8	IC420	I-7
CN500	A-3	IC530	D-12
CN570	A-6	IC540	B-1
CN600	G-1	IC580	A-8
		IC600	I-2
D101	F-10	IC660	E-1
D102	F-7	IC850	G-11
D104	F-2	IC970	C-3
D161	D-2		
D162	J-13	Q100	F-11
D163	I-1	Q101	F-3
D164	F-6	Q102	G-7
D165	I-12	Q161	E-2
D166	F-1	Q162	E-2
D401	J-1	Q163	J-13
D500	B-3	Q201	C-7
D501	B-3	Q202	C-7
D504	B-3	Q208	C-6
D505	B-3	Q209	D-5
D511	B-4	Q210	E-2
D512	B-3	Q211	E-6
D513	A-4	Q260	C-10
D514	A-4	Q301	C-8
D515	A-4	Q321	C-8
D516	A-5	Q501	B-3
D517	B-2	Q502	B-3
D540	A-7	Q503	E-11
D541	A-7	Q510	A-5
D542	A-6	Q540	B-4
D543	A-6	Q580	D-11
D544	A-6	Q581	E-10
D545	A-1	Q582	E-10
D571	B-6	Q583	E-10
D572	B-6	Q600	G-2
D575	A-5	Q601	G-2
D576	A-5	Q602	I-1
D579	A-5	Q603	I-3
D580	F-9	Q604	I-3
D581	F-9	Q605	I-3
D582	B-12	Q606	I-1
D583	B-12	Q660	D-1
D600	H-1	Q661	D-2
D601	H-1	Q662	D-2
D602	H-1	Q750	B-13
D661	F-1	Q751	A-12
D662	F-2	Q752	A-13
D702	C-12	Q850	F-11
D703	F-13	Q970	D-3
D751	B-12	Q972	C-2
D752	B-12	Q974	C-3
		Q975	D-3
		Q976	D-3



4-4

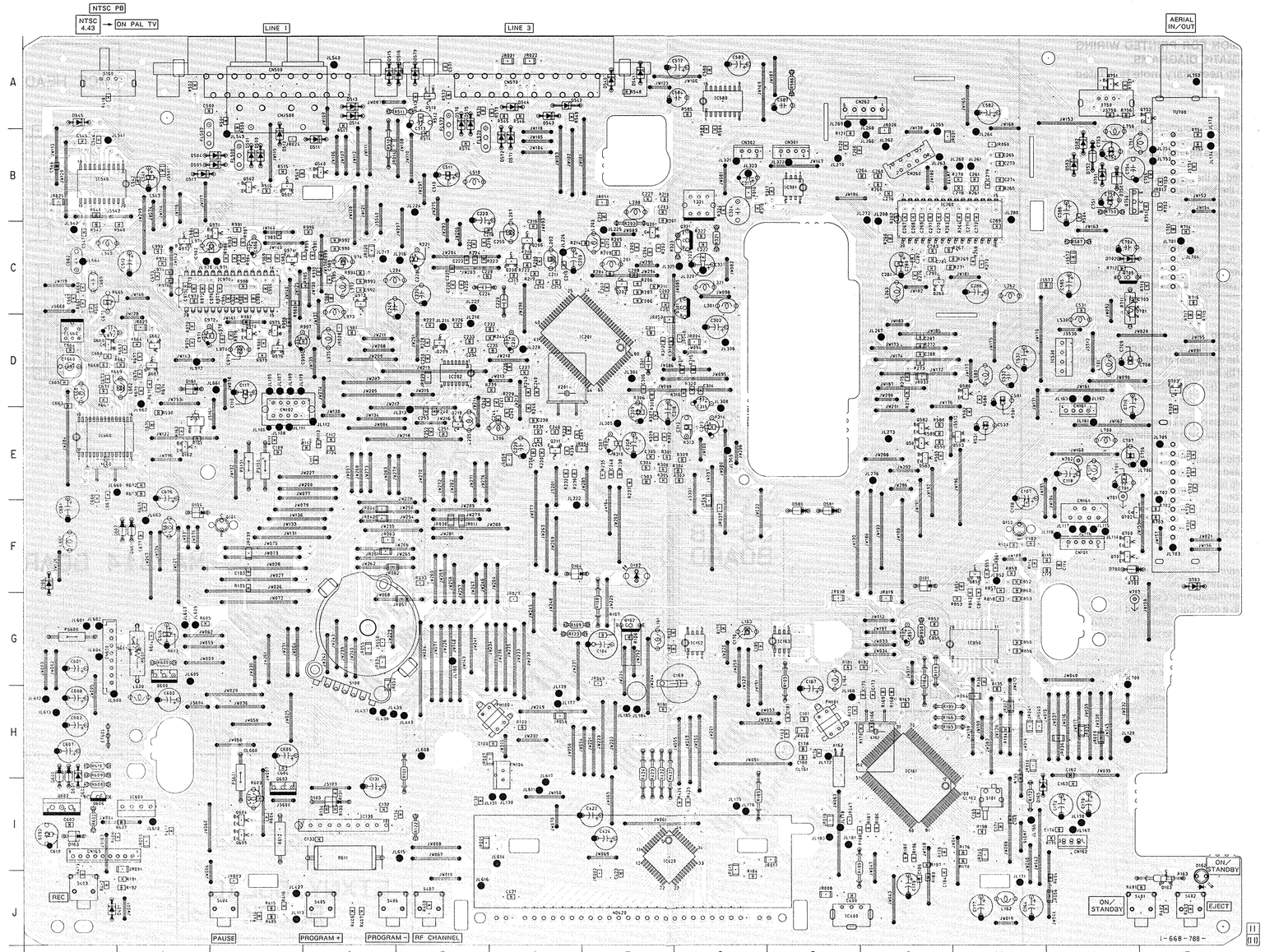
HEAD AMP, VIDEO, AUDIO, IO, SERVO/SYSTEM CONTROL, TUNER
MA-314

MA-314 (HEAD AMP, VIDEO, AUDIO, IO, SERVO/SYSM CONTROL, TUNER) PRINTED WIRING BOARD

– Ref. No.: MA-314 board; 1,000 series –

There are few cases that the part isn't mounted in this model is printed on this diagram.

MA-314 BOARD

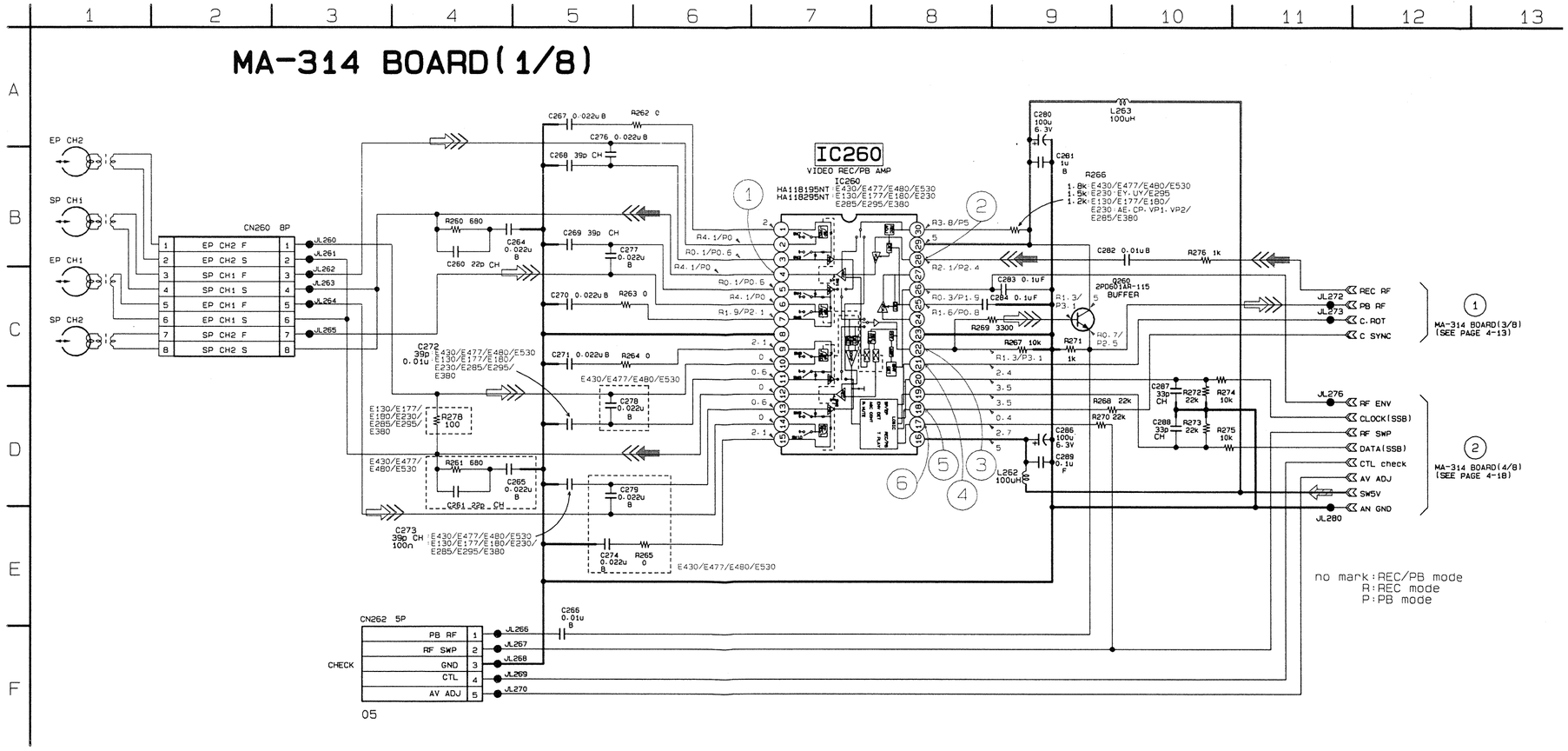


4-5

4-6

MA-314 (HEAD AMP) SCHEMATIC DIAGRAM

– Ref. No.: MA-314 board; 1,000 series –

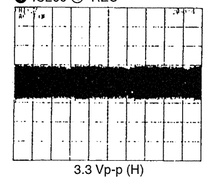


- Signal path

	VIDEO SIGNAL
	Y/CHROMA
REC	⇛
PB	⇨

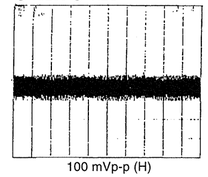
- **Waveforms**

❶ IC260 ④ REC



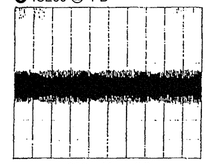
3.3 Vp-p (H)

❷ IC260 ㉘ REC



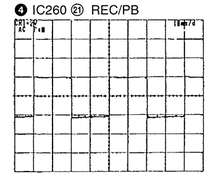
100 mVp-p (H)

❸ IC260 ㉒ PB



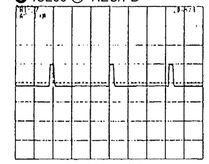
650 mVp-p (H)

❹ IC260 ㉑ REC/PB



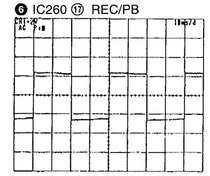
4.4 Vp-p (2 V)

❺ IC260 ⑯ REC/PB



2.5 Vp-p (H)

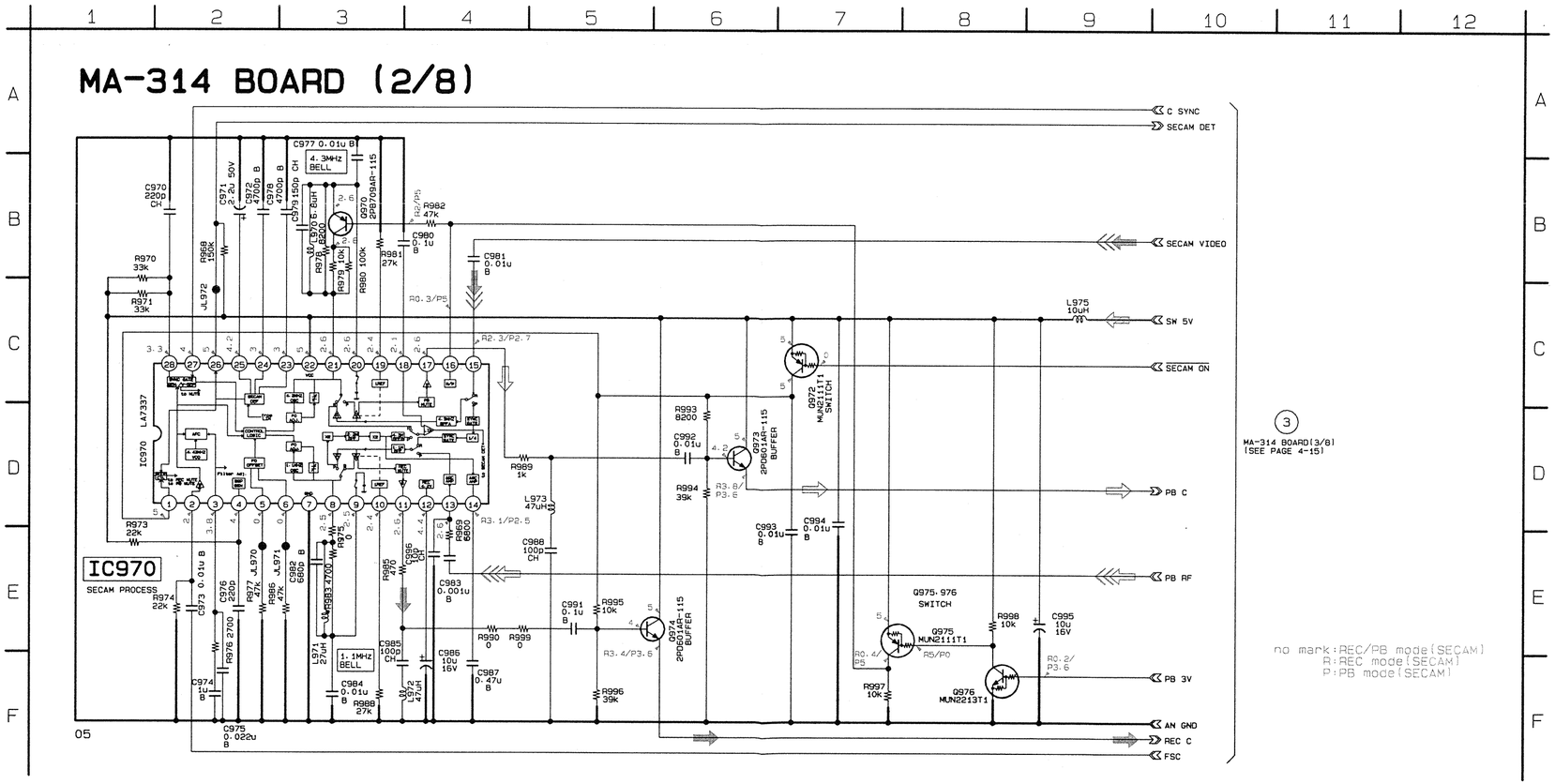
❻ IC260 ⑰ REC/PB



5.2 Vp-p (2 V)

MA-314 (SECAM) SCHEMATIC DIAGRAM • **See page 4-4 to 4-6 for printed wiring board.**

– Ref. No.: MA-314 board; 1,000 series –

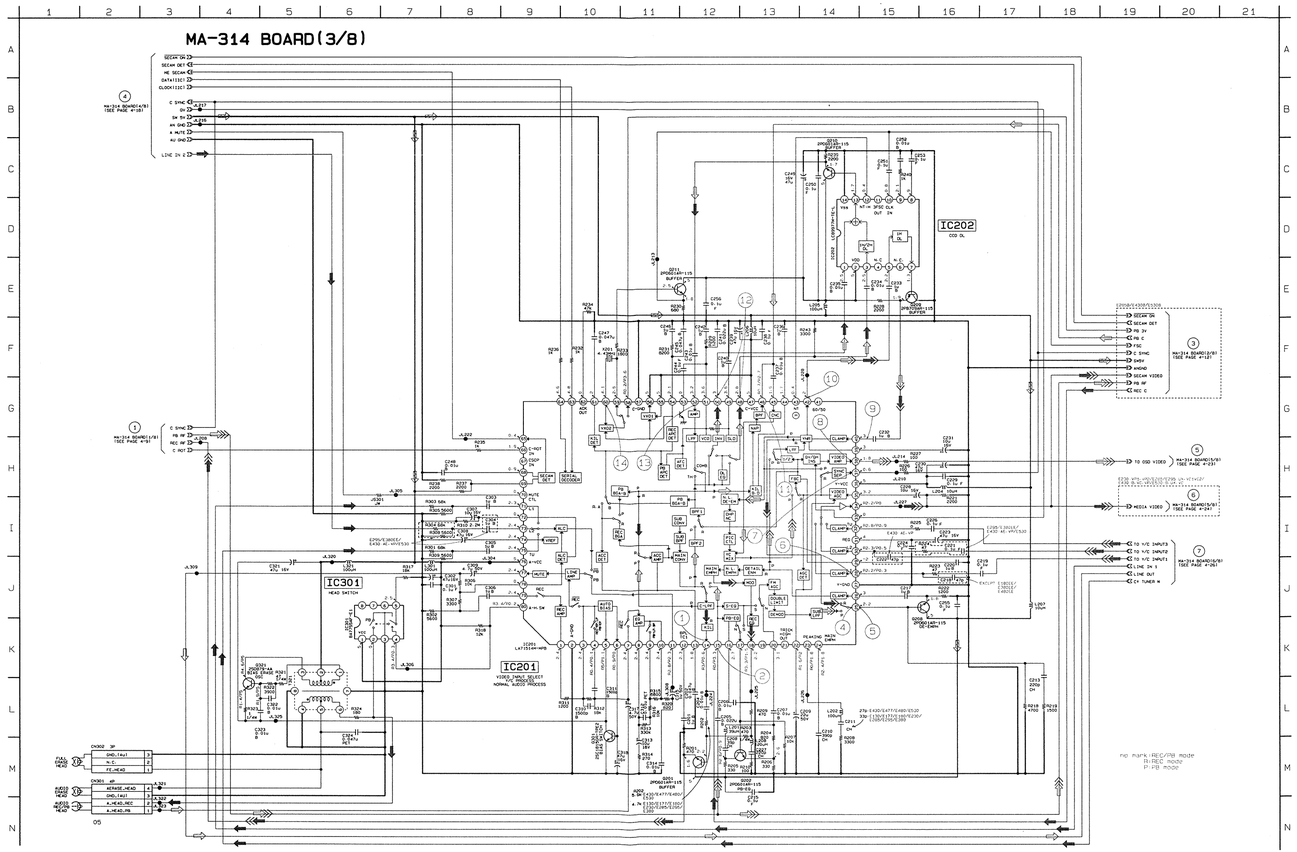


• Signal path

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	⇒	⇒	⇒
PB	⇨	⇨	⇨

MA-314 (VIDEO, AUDIO) SCHEMATIC DIAGRAM • See page 4-4 to 4-6 for printed wiring board.

– Ref. No.: MA-314 board; 1,000 series –

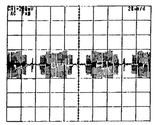


• Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	⇒	⇒	⇒	➡
PB	⇨	⇨	⇨	⇨

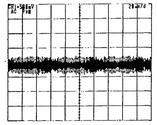
• Waveforms

❶ IC201 ⑭ REC



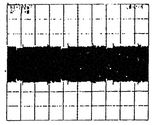
400 mVp-p (H)

❷ IC201 ⑬ PB



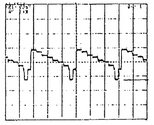
650 mVp-p (H)

❸ IC201 ⑱ REC



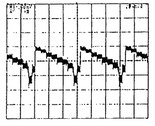
310 mVp-p (H)

❹ IC201 ㉕ REC



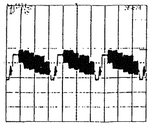
450 mVp-p (H)

❺ IC201 ㉓ PB



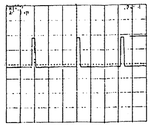
600 mVp-p (H)

❻ IC201 ㉖ REC/PB



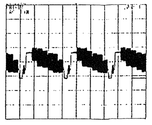
1 Vp-p (H)

❼ IC201 ㉗ REC/PB



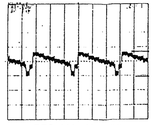
4.2 Vp-p (H)

❽ IC201 ㉘ REC/PB



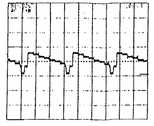
2.2 Vp-p (H)

❾ IC201 ㊽ REC/PB



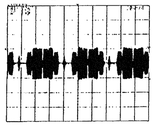
REC: 380 mVp-p (H)
PB : 410 mVp-p (H)

❿ IC201 ㊷ REC/PB



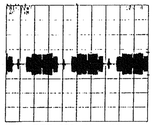
360 mVp-p (H)

⓫ IC201 ⑭ PB



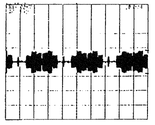
490 mVp-p (H)

⓬ IC201 ㊾, ㊿ REC/PB



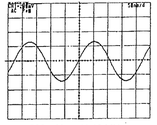
REC: 350 mVp-p (H)
PB : 300 mVp-p (H)

⓭ IC201 ㊿ REC/PB



REC: 380 mVp-p (H)
PB : 280 mVp-p (H)

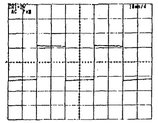
⓮ IC201 ㊽ REC/PB



520 mVp-p (4.43 MHz)

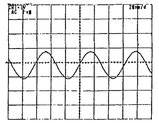
• Waveforms

❶ IC161 ⑭ REC/PB



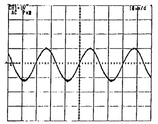
5.3 Vp-p (2 V)

❷ IC161 ⑮ REC/PB



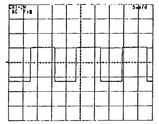
2.6 Vp-p (16 MHz)

❸ IC161 ⑭ REC/PB



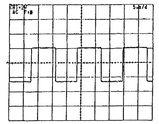
2.3 Vp-p (32.768 kHz)

❹ IC161 ⑰ REC/PB



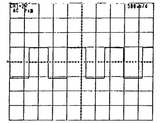
5.3 Vp-p (62.5 kHz)

❺ IC161 ⑱ REC/PB



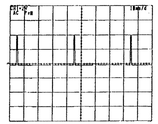
5.3 Vp-p (62.5 kHz)

❻ IC161 ⑮ REC/PB



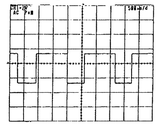
4.5 Vp-p (757.6 kHz)

❼ IC161 ⑯ REC/PB



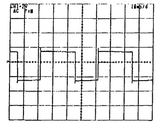
4.5 Vp-p (2 V)

❽ IC161 ⑱ REC/PB



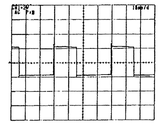
4.1 Vp-p (300 Hz)

❾ IC161 ⑰ REC



5.2 Vp-p (2 V)

❿ IC161 ⑱ REC



5.2 Vp-p (2 V)

• Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	➡	➡
PB	⇨	⇨

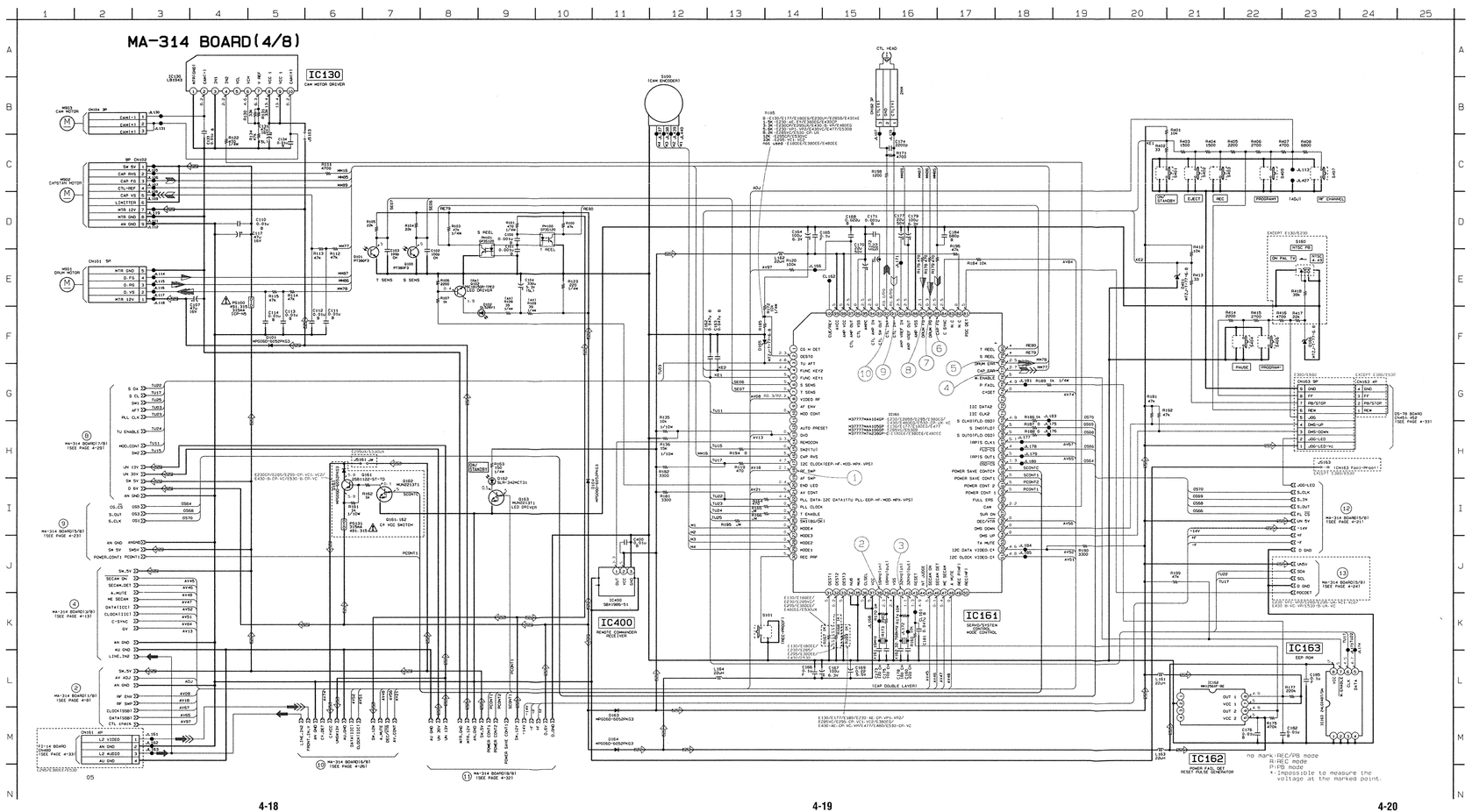
• Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷	
Drum servo (speed and phase)		▷	
Capstan speed servo		▷	
Capstan servo (speed and phase)		▷	
Ref. signal	▶		▷

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

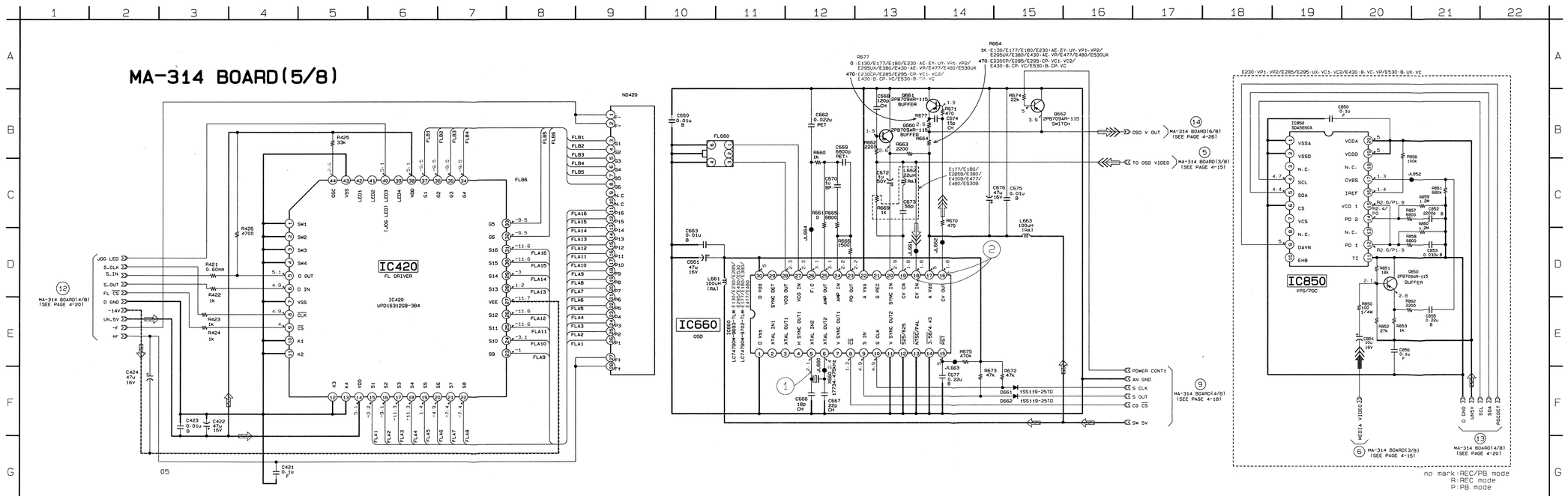
MA-314 (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM • See page 4-4 to 4-6 for printed wiring board.

– Ref. No.: MA-314 board; 1,000 series –



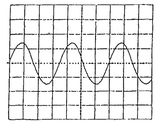
MA-314 (FL DRIVER, OSD, VPS/PDC) SCHEMATIC DIAGRAM • **See page 4-4 to 4-6 for printed wiring board.**
– Ref. No.: MA-314 board; 1,000 series –

MA-314 BOARD(5/8)



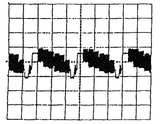
• **Waveforms**

❶ IC660 ⑤ REC/PB



2.6 Vp-p (17.73 MHz)

❷ IC660 ⑯, ⑱ REC/PB

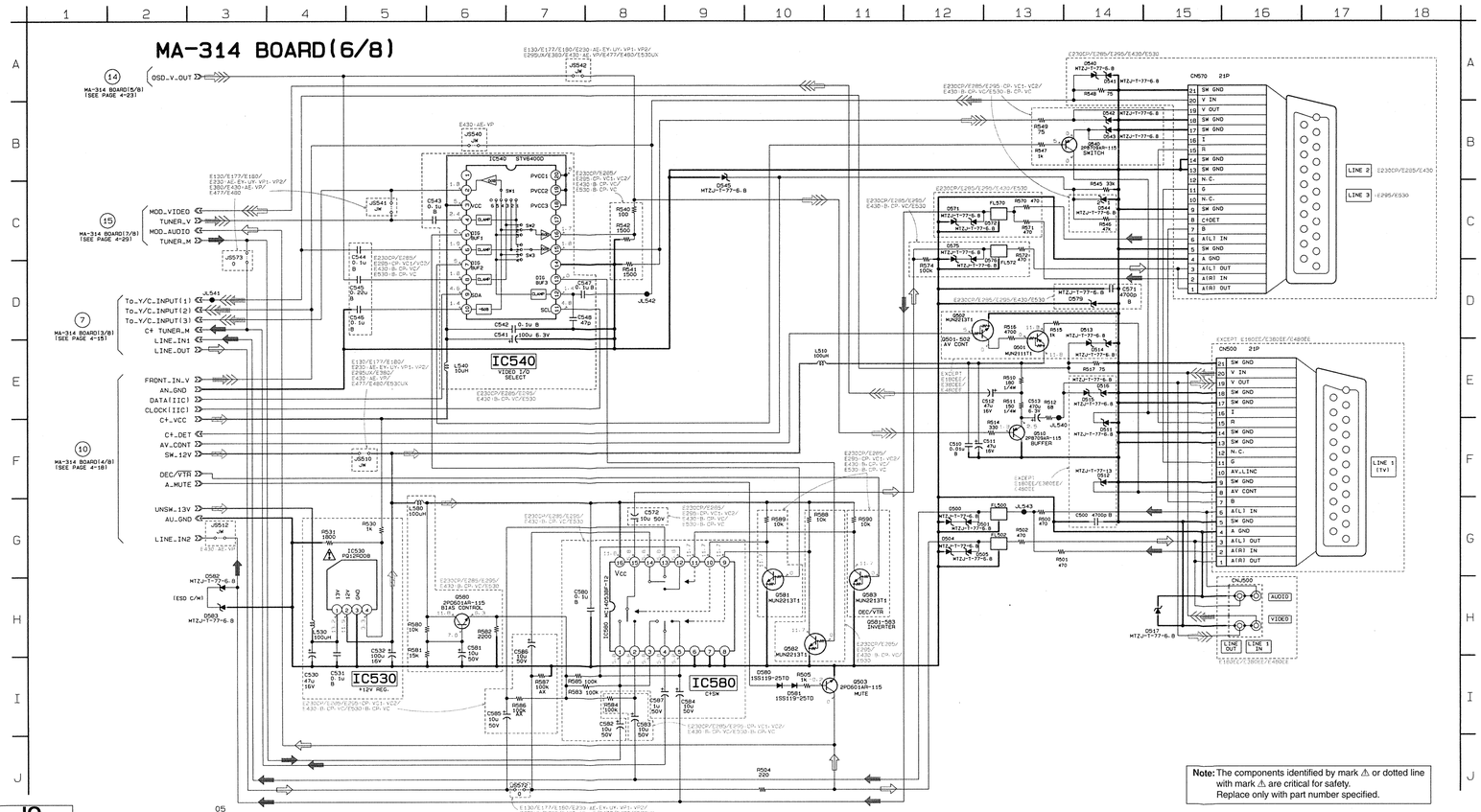


2.1 Vp-p (H)

• Signal path

	VIDEO SIGNAL
	Y/CHROMA
REC	⇒
PB	⇨

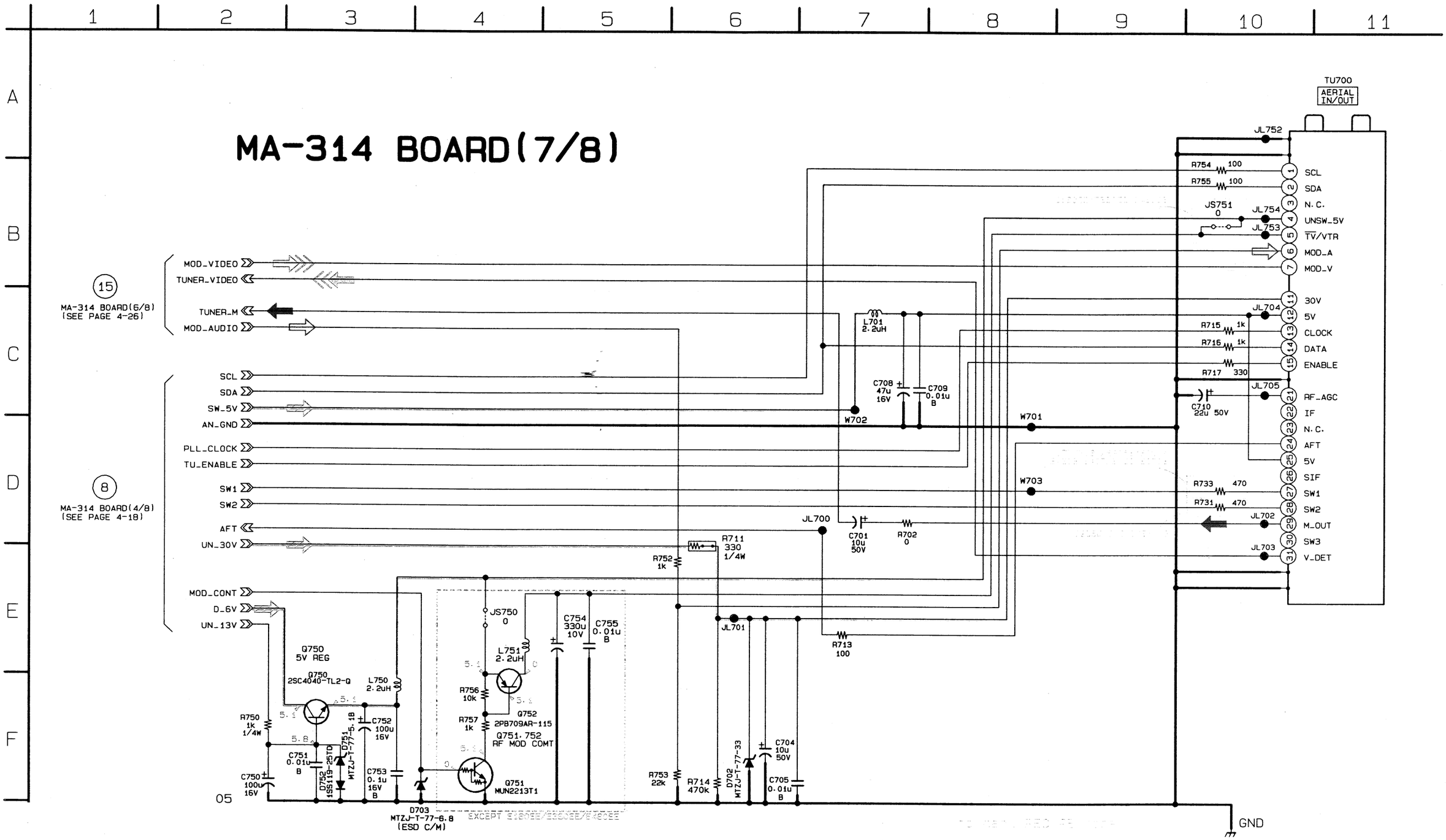
MA-314 (IO) SCHEMATIC DIAGRAM • **See page 4-4 to 4-6 for printed wiring board.**
– Ref. No.: MA-314 board; 1,000 series –



• Signal path

	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	▨	■
PB	▨	□

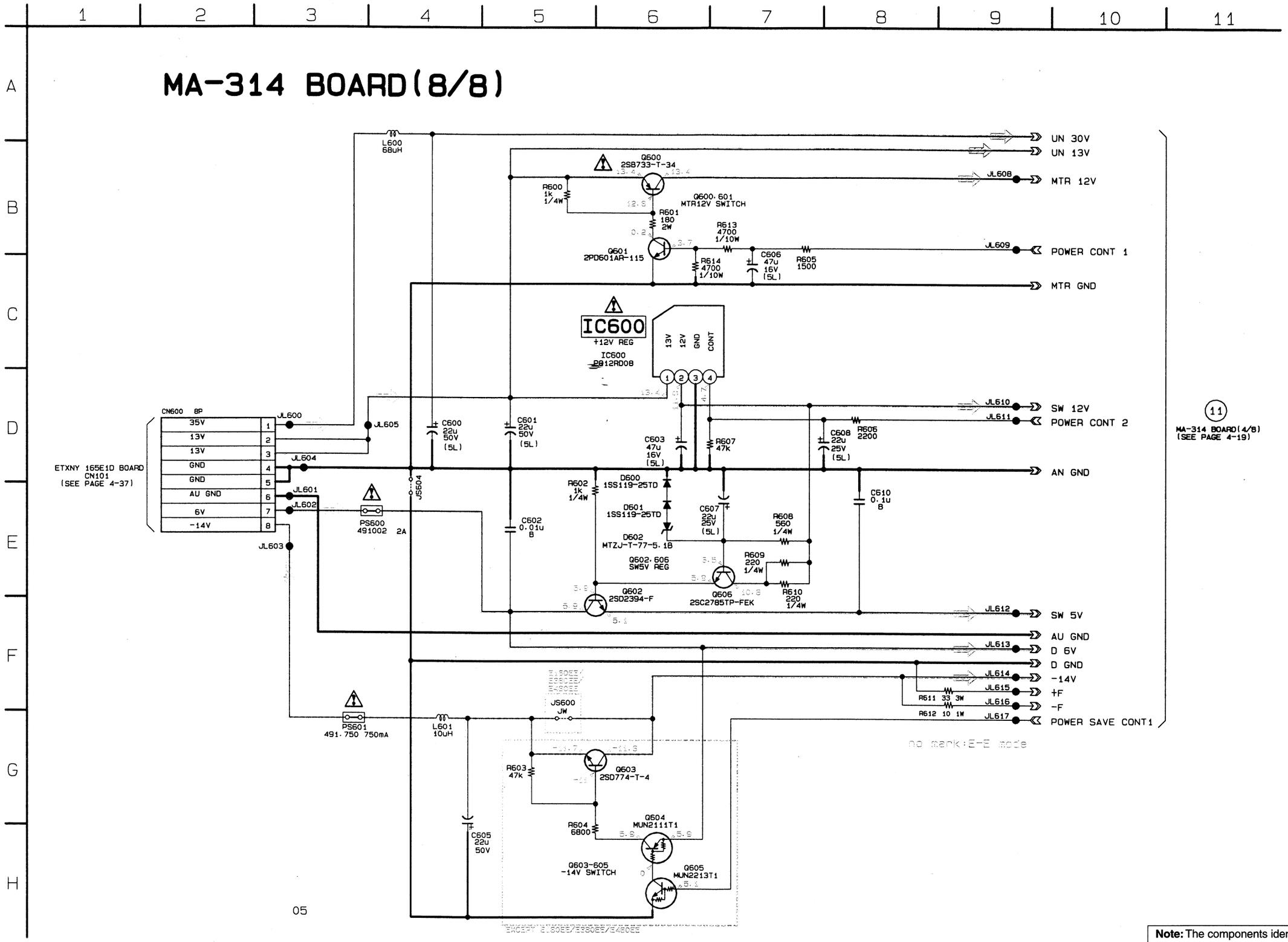
MA-314 (TUNER) SCHEMATIC DIAGRAM • **See page 4-4 to 4-6 for printed wiring board.**
– Ref. No.: MA-314 board; 1,000 series –



• Signal path

	VIDEO SIGNAL	AUDIO SIGNAL
	Y/CHROMA	
REC		➡
PB		⇨

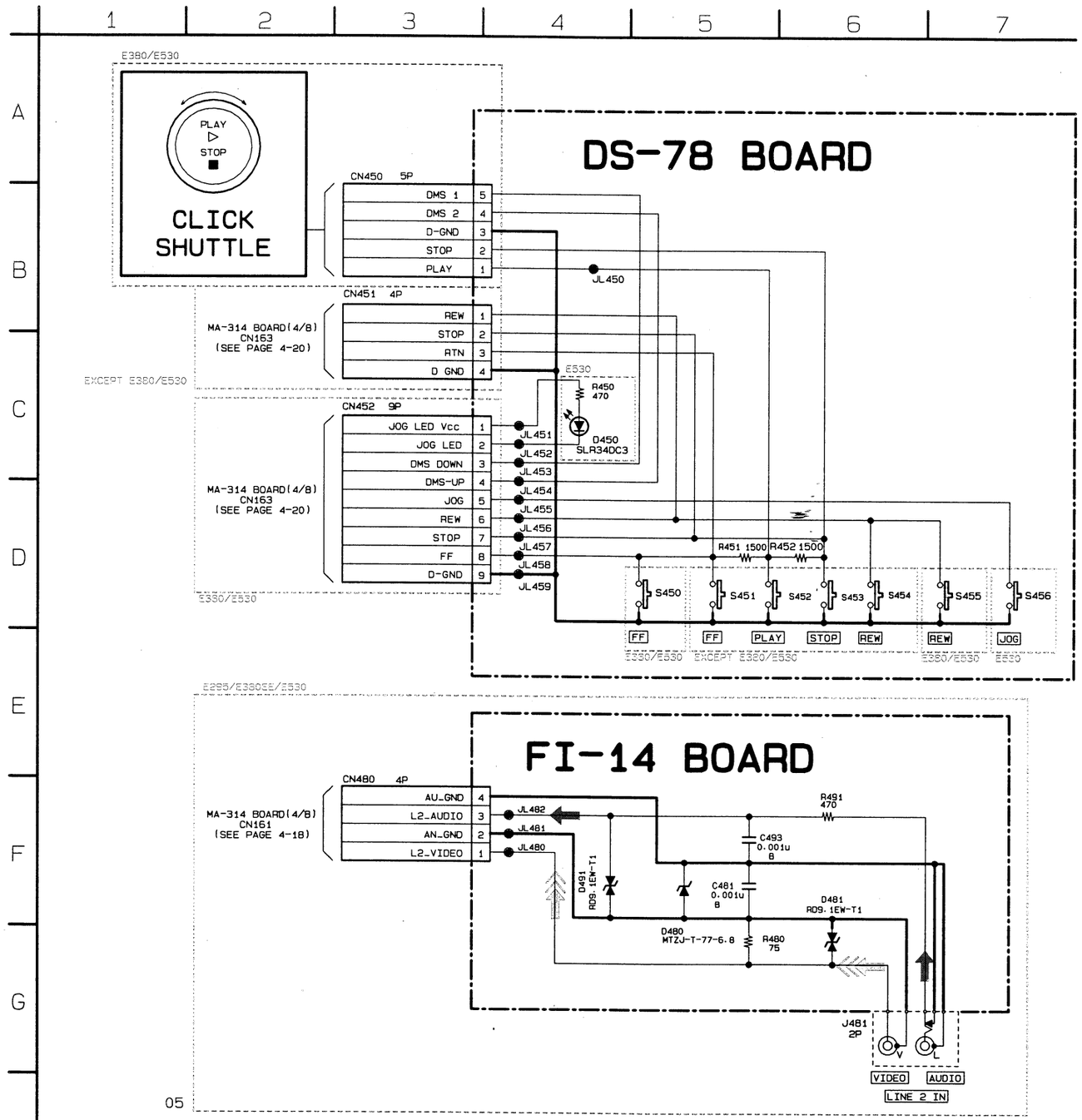
MA-314 (POWER SUPPLY) SCHEMATIC DIAGRAM • **See page 4-4 to 4-6 for printed wiring board.**
– Ref. No.: MA-314 board; 1,000 series –



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

DS-78 (MODE CONTROL), FI-14 (FRONT IN) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

– Ref. No.: DS-78 board, FI-14 board; 1,000 series –

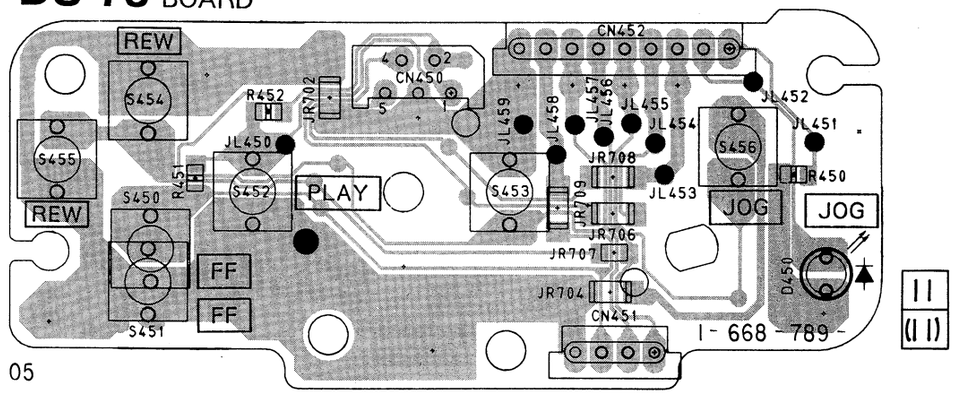


• Signal path

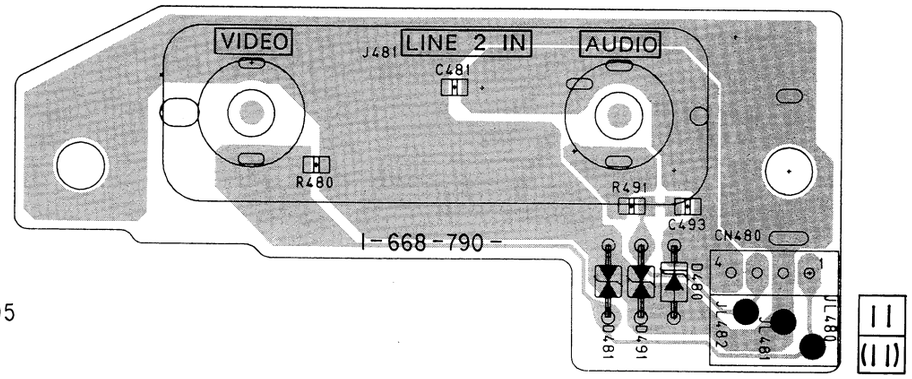
	VIDEO SIGNAL Y/CHROMA	AUDIO SIGNAL
REC	⇒	➡
PB	⇒	⇨

There are few cases that the part isn't mounted in this model is printed on this diagram.

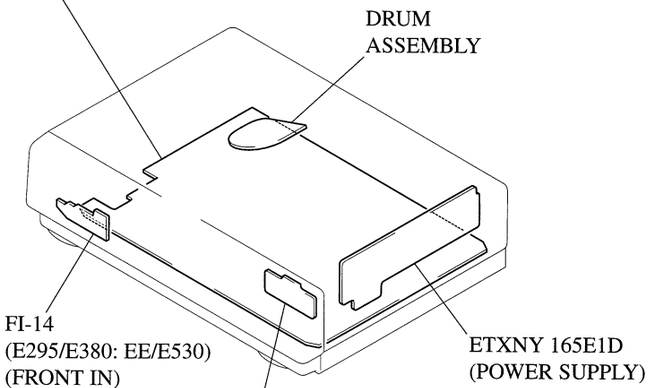
DS-78 BOARD



FI-14 BOARD

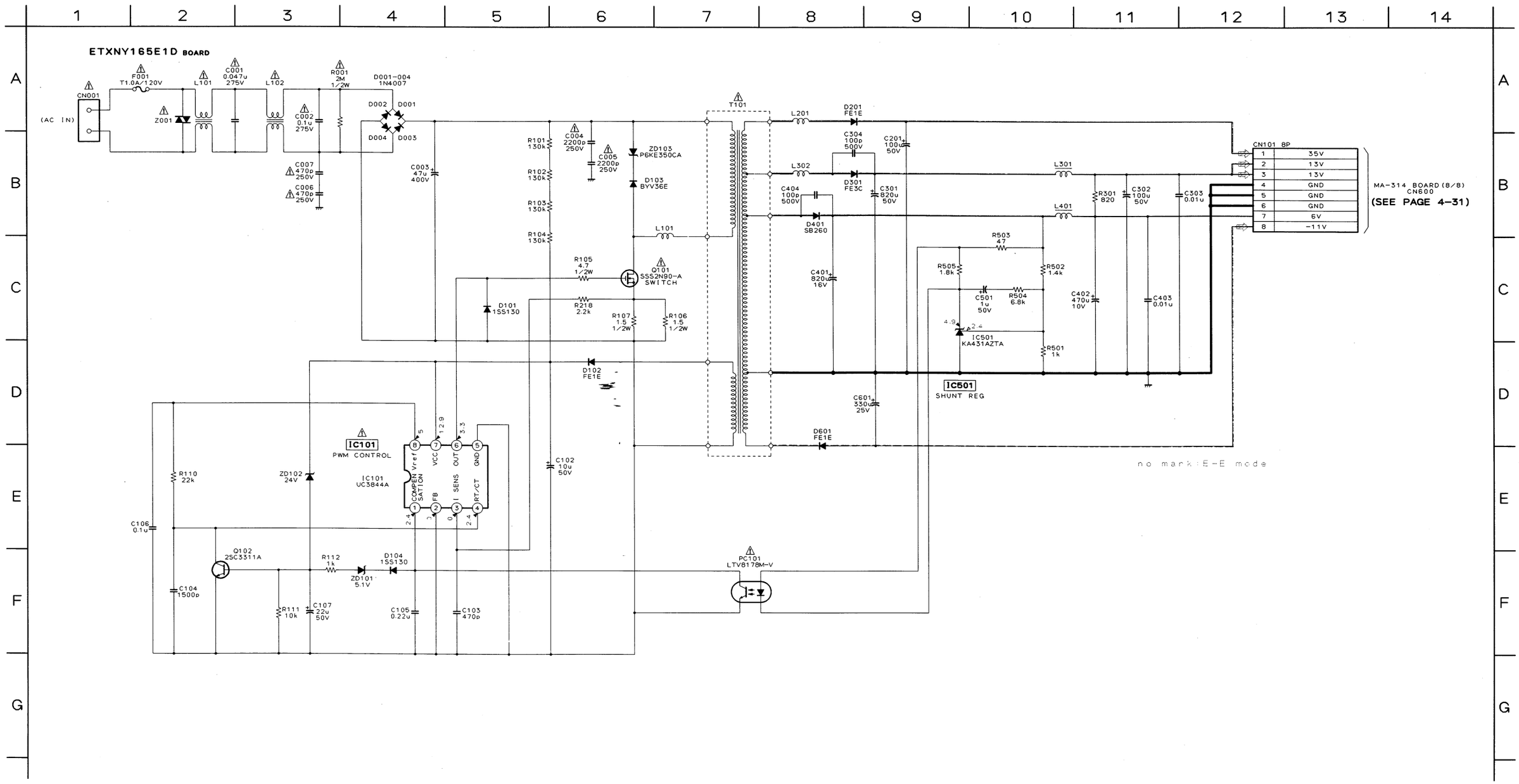


MA-314
(HEAD AMP, VIDEO, AUDIO, IO, SERVO/SYSTEM CONTROL, TUNER)



ETXNY 165E1D (POWER SUPPLY) SCHEMATIC DIAGRAM

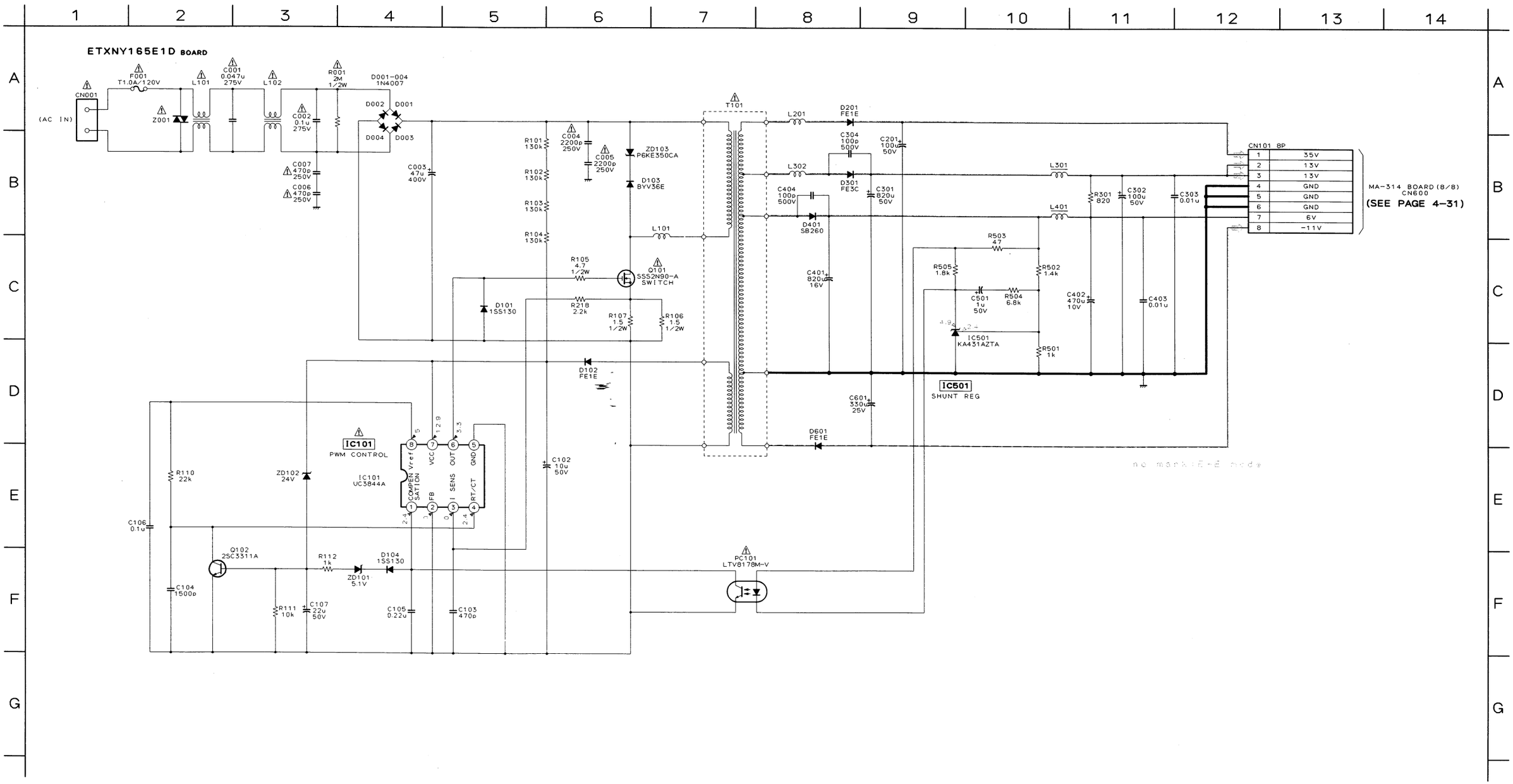
– Ref. No.: ETXNY 165ED board; 2,000 series –



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

ETXNY 165E1D (POWER SUPPLY) SCHEMATIC DIAGRAM

– Ref. No.: ETXNY 165ED board; 2,000 series –



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1. SYSTEM CONTROL – VIDEO/RP BLOCK INTERFACE (MA-314 BOARD IC161)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	REC	REC • PAUSE
RF SWP	MA-314 IC161⑱	O	∗1	∗1	∗1	∗1	∗1	∗1
QVD	MA-314 IC161⑬	O	L	L	L	∗2	L	L
REC P	MA-314 IC161㊾	O	L	L	L	L	L	H
C SYNC	MA-314 IC161㉞	I	∗3	∗3	∗3	∗3	∗3	∗3

∗1. Synchronized with drum rotation. 25 Hz 50% duty pulse.
∗2. Normally “L”. “H” when videl signal is not generated.
∗3. Composite sync signal (positive).

5-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE (MA-314 BOARD IC161)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE LOADING	TAPE UNLOADING	PB	REC
CTL IN+	MA-314 IC161㉒	O	∗7	∗7	∗7	∗7	∗7	∗7	∗1
DRM PG	MA-314 IC161㉘	I	∗3	∗3	∗3	∗3	∗3	∗3	∗3
DRM FG	MA-314 IC161㉗	I	∗4	∗4	∗4	∗4	∗4	∗4	∗4
CAP FG	MA-314 IC161㉕	I	H/L	∗2	∗2	∗5	∗5	∗2	∗2
CAP RVS	MA-314 IC161⑯	O	H/L	L	H	L	H	L	L
CAP ERR	MA-314 IC161㊼	O	L	∗6	∗6	∗6	∗6	∗6	∗6
DRM ERR	MA-314 IC161㊽	O	∗6	∗6	∗6	∗6	∗6	∗6	∗6

∗1. 25 Hz pulse.
∗2. Pulse of period in proportion to tape speed.
∗3. 25 Hz “H” pulse.
∗4. 300 Hz pulse.
∗5. Unstable period pulse.
∗6. DC voltage 1~5V.
∗7. Hi-Z (2.5V).

5-3. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE (MA-314 BOARD IC161)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	REC
CAM	MA-314 IC161㊽	O	M	H/M	L/M	H/M	L/M	M	M	M	M	M
MODE 1	MA-314 IC161㉙	I	H	–	–	L	L	H	H	H	H	H
MODE 2	MA-314 IC161㉘	I	H	–	–	L	L	H	H	H	L	L
MODE 3	MA-314 IC161㉗	I	L	–	–	H	H	H	L	L	L	L
MODE 4	MA-314 IC161㉖	I	L	–	–	H	H	L	H	H	L	L
REC PRF	MA-314 IC161㉚	I	L	*1	*1	*1	*1	*1	*1	*1	*1	*1
T REEL	MA-314 IC161㊿	I	H/L	H/L	H/L	H/L	H/L	H/L	*2	*2	*2	*2
S REEL	MA-314 IC161㊾	I	H/L	H/L	H/L	*2	*2	H/L	*2	*2	*2	*2
END LED	MA-314 IC161⑳	O	L	*3	*3	*3	*3	*3	*3	*3	*3	*3
T SENS	MA-314 IC161⑦	I	*3	*3	*3	*4	*4	*4	*4	*4	*4	*4
S SENS	MA-314 IC161⑥	I	*3	*3	*3	*4	*4	*4	*4	*4	*4	*4

∗1. “L” when erasing protection tab is bent. “H” when not bent.
∗2. Pulse of period in proportion to reel rotating speed.
∗3. Approx. 2 msec period “H” pulse.
∗4. Normally “L” .2 msec period “H” pulse when tape top or tape end is detected.
∗5. Hi-Z

5-4. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-314 BOARD IC161)

Signal	Pin No.	I/O	I/O level
RESET	MA-314 IC161㊸	I	Normally “H”, “L” when service interruption is detected or restored.
I2C DATA VIDEO	MA-314 IC161㊷	O	Serial communication data to video microprocessor.
I2C CLOCK VIDEO	MA-314 IC161㊶	O	Serial communication clock with video microprocessor.
PLL DATA I2C DATA 1	MA-314 IC161㉒	O	Serial communication data to audio microprocessor.
I2C CLOCK 1	MA-314 IC161⑰	O	Serial communication clock with audio microprocessor.
(RP) S OUT 1	MA-314 IC161㊺	O	Serial communication data to RP microprocessor.
(RP) S CLK 1	MA-314 IC161㊼	O	Serial communication clock to RP microprocessor.

5-5. SYSTEM CONTROL – AUDIO BLOCK INTERFACE (MA-314 BOARD IC161)

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	REC	REC • PAUSE
A MUTE	MA-314 IC161㊽	O	L	L	L	L	L	H

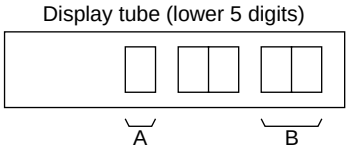
5-6. SERVO/SYSTEM/TIMER/TUNER CONTROL MICROPROCESSOR PIN FUNCTION (MA-314 BOARD IC161)

Pin No.	Pin name	I/O	Function
1	N.C.	–	Not used
2	DEST 0	I	Destination judgement 0
3	TU AFT	I	Tuner analog auto fine tuning input
4	FUNK KEY 2	I	9 KEY input
5	FUNK KEY 1	I	9 KEY input
6	S SENS	I	Tape end sensor input
7	T SENS	I	Tape top sensor input
8	VIDEO RF	I	Video RF input
9	N.C.	–	Not used
10	MOD CONT	O	RF MOD power control
11	N.C.	–	Not used
12	N.C.	–	Not used
13	QVD	O	Quasi VD pulse output
14	REMOCON	I	Remote control signal input
15	SW2	O	Tuner system select
16	CAP RVS	O	Capstan reverse signal output
17	I²C CLOK	O	I²C clock (EEPROM, MOD, MPX, VPS)
18	RF SWP	O	RF switching pulse output
19	N.C.	–	Not used
20	END LED	O	LED output to tape top and tape end sensor
21	AV CONT	O	Euro 21 pin control
22	PLL DATA (I²C DATA 1)	O	Tuner PLL data/I²C data (EEPROM, MOD, MPX, VPS)
23	PLL CLOCK	O	Tuner PLL clock output
24	T ENABLE	O	Tuner enable signal output
25	SW1	O	Tuner system select
26	MODE 4	I	CAM encoder input 4
27	MODE 3	I	CAM encoder input 3
28	MODE 2	I	CAM encoder input 2
29	MODE 1	I	CAM encoder input 1
30	REC PRF	I	Cassette erasing protect tab detect switch input
31	DEST 1	I	Destination judgment 1
32	DEST 2	I	Destination judgment 2
33	DEST 3	I	Destination judgment 3
34	NUB	I	Fixed to GND
35	NUA	I	Fixed to GND
36	CLKSEL	I	Fixed to 5V
37	VCC	–	5V
38	16MHz (in)	I	16MHz
39	16MHz (out)	O	16MHz
40	VSS	–	GND
41	32KHz (in)	I	32KHz
42	32KHz (out)	O	32KHz
43	RESET	I	RESET signal input
44	N.C.	–	Not used
45	$\overline{\text{SECAM ON}}$	O	“L” output when SECAM mode
46	SECAM DET	I	SECAM detect signal input
47	ME SECAM	I	MESECAM judgement input
48	A MUTE	O	Audio mute signal
49	N.C.	–	Not used
50	N.C.	–	Not used

Pin No.	Pin name	I/O	Function
51	I²C CLOCK VIDEO, C+	O	I²C clock (VIDEO, C+)
52	I²C DATA VIDEO, C+	O	I²C data (VIDEO, C+)
53	TA MUTE	O	Tuner audio mute signal output
54	DMS UP	I	Dual mode shuttle control signal input
55	DMS DOWN	I	Dual mode shuttle control signal input
56	DEC/$\overline{\text{VTR}}$	O	Decoder/VTR select
57	SUR ON	O	Surround control
58	CAM	O	CAM motor control
59	N.C.	–	Not used
60	POWER CONT 1	O	MTR 12V control
61	POWER CONT 2	O	SW 12V control
62	POWER SAVE CONT 1	O	–14V control
63	POWER SAVE CONT C+	O	C+ VCC control
64	$\overline{\text{OSD-CS}}$	O	OSD chip select signal output
65	S OUT 1	O	Serial communication signal (RP)
66	$\overline{\text{FLD-CS}}$	O	FL driver chip select signal output
67	S CLK 1	O	Serial communication (RP)
68	S OUT 0	O	Serial communication signal output (FLD, OSD)
69	S IN 0	I	Serial communication signal input (FLD)
70	S CLK 0	O	Serial communication clock output (FLD, OSD)
71	N.C.	–	Not used
72	N.C.	–	Not used
73	N.C.	–	Not used
74	C+DET	I	CANAL + signal input
75	P FAIL	I	Power failure detection input
76	W. ENABLE	O	EEPROM write protect
77	CAP ERR	O	Capstan error output
78	DURM ERR	O	Drum error output
79	S REEL	I	Supply reel sensor input
80	T REEL	I	Take-up reel sensor input
81	PDCDET	I	PDC/VPS receiving signal input
82	CHECK	I	Check signal input
83	N.C.	–	Not used
84	C SYNC	I	Composite sync input
85	CAP FG	I	Capstan FG input
86	DURM PG	I	Drum PG input
87	DURM FG	I	Drum FG input
88	AMP VSS	–	CTL amplifier GND
89	AMP VREF OUT	O	CTL amplifier
90	AMP VPEF IN	I	CTL amplifier
91	CTL IN–	I/O	CTL singal (–) input/output
92	CTL IN+	I/O	CTL singal (+) input/output
93	CTL SW OUT	O	CTL switch output
94	CTL AMP IN	I	CTL amplifier input
95	AMPC	I	CTL amplifier
96	CTL VSS	–	CTL amplifier GND
97	CTL AMP OUT	O	CTL amplifier output
98	AMP VCC	–	CTL amplifier 5V
99	A VCC	–	Analog 5V
100	N.C.	–	Not used

SECTION 6
ERROR CODES

This set displays an error code, and a mode code in case of error on the display tube, if the operation stopped by error.
The following provides description concerned.



A: Error code ..... Table 6-1
B: Mode code in case of error ..... Table 6-2

These codes are displayed at lower 5-digit positions of display tube.
In this case, " : " between digits is not displayed.

Table 6-1. Error Codes

Code	Description
0	NO ERROR
1	CAM ENCODER ERROR, LOAD DIRECTION
2	CAM ENCODER ERROR, UNLOAD DIRECTION
3	T REEL ERROR
4	S REEL ERROR
5	CAPSTAN ERROR
6	DRUM ERROR
7	INITIALIZE ERROR
8	CASSETTE UNLOADING ERROR
9	RESERVED

Table 6-2. Mode Codes in Case of Error

Code	Description
0	POWER-ON EJECT
1	POWER-ON INITIAL
2	POWER-OFF EJECT
3	POWER-OFF STOP
4	FF
5	REW
6	REC
7	REC-PAUSE
8	POWER-ON STOP
9	PB
10	FWD R1
11	FWD R2
12	CUE
13	PB-PAUSE
14	RVS-PAUSE
15	RVS R1
16	RVS R2
17	REV
18	POWER-OFF INITIAL
19	MECHA ERROR (POWER OFF)
20	REW PLAY
21	CAS LOADING
22	TAPE LOADING
23	POWER-OFF LOADING
24	MECHA ERROR (POWER ON)
25	POWER-ON EJECT INITIAL
26	POWER-OFF EJECT INITIAL
27	APC REC
28	CAS LOADING (NO AUTO PB CHECK)

SECTION 7
ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram for Adjustment on page 7-6.

7-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT VI.

7-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used.

1) Color TV
2) Oscilloscope 1or 2 phenomena, band more than 30 MHz, deley mode, as provided.
3) Frequency counter (min. 8 digits)
4) PAL pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio noise meter
8) Audio generator
9) Modulation Analyzer
10) Distortion factor meter
11) Attenuator
12) Alignmeter tape
    Part Code: 8-192-605-36 (KRV-51P)

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

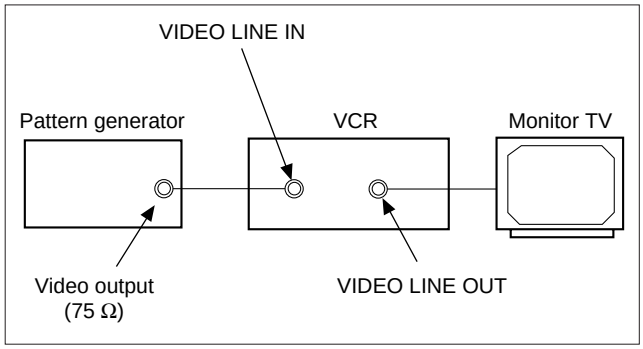


Fig. 7-2-1

2-1-3. Set-up of Adjutment

In this adjustment, PAL pattern generator is connected with LINE input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal PAL signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst signal and “red” signal are 0.30 : 0.66. Fig. 7-2-2. shows video signals (color bars) used in adjusting the video section.

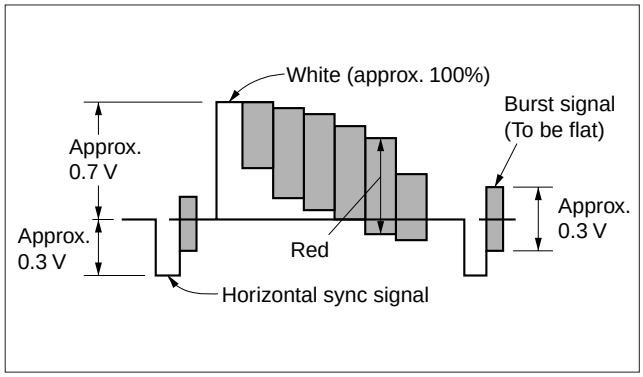


Fig. 7-2-2.

2-1-4. Alignment Tape
[Alignment Tape (KRV-51P)]

	Mode	Time	Video signal	Audio signal (HiFi/Normal)
1	SP	Seven minutes	Color bar	400 Hz
2		Three minutes	Monoscope	400 Hz
3	EP	Seven minutes	Color bar	400 Hz
4		Three minutes	Monoscope	400 Hz

2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video inputs LINE IN : phono jacks
EURO-AV : 21-pin (Pin ⑳) 1 Vp-p, 75 Ω, unbalanced, sync nagative

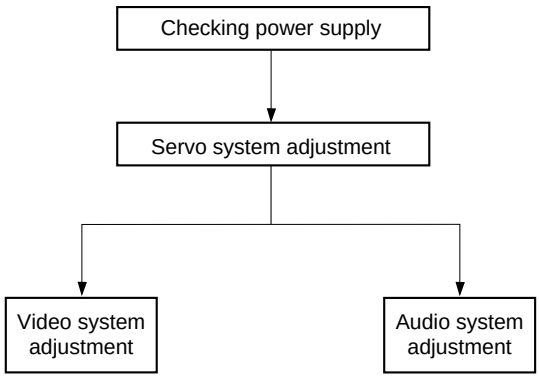
Audio inputs LINE IN : phono jack
47 kW, –75 dBs (0 dBs = 0.775 Vrms)
EURO-AV : 21-pin (Pin ② and ⑥)
More than 10 kΩ, –4 dBs

Video outputs LINE OUT : phono jack
EURO-AV : 21-pin (Pin ⑲) 1 Vp-p, 75 Ω, unbalanced, sync negative

Audio outputs LINE OUT : phono jacks
–7.5 dBs at load impedance 47 kΩ
Output impedance : less than 10 kΩ
EURO-AV : 21-pin (Pin ① and ③)
Output impedance : less than 1 kΩ
–4 dBs with 10 kΩ load

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.



2-2. POWER SUPPLY ADJUSTMENT

2-2-1. Power Supply Check

Mode	E-E
Measuring Instrument	Digital voltmeter
–11.5 V check	
Measurement Point	Pin ⑧ of CN600 (MA-314 board)
Specified Value	11.4 $^{+1.2}_{-0.5}$ V
D6 V check	
Measurement Point	Pin ⑦ of CN600 (MA-314 board)
Specified Value	5.9 ± 0.2 V
+13 V check	
Measurement Point	Pin ②, ③ of CN600 (MA-314 board)
Specified Value	13.75 ± 0.55 V
+35 V check	
Measurement Point	Pin ① of CN600 (MA-314 board)
Specified Value	35 ± 3.5 V

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO SYSTEM Adjustment

2-3-1. RF Switching Position Adjustment (MA-314 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.

Improve the interchangeability with other tapes and sets.

When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape SP mode color bar
Measurement Point	CH1: VIDEO LINE OUT CH2: Pin ② of CN262 (RF SWP)
Measuring Instrument	Oscilloscope
Specified Value	6.5 ± 0.5 H (416 ± 32 µsec)

Adjusting Method:

1) Connect MA-314 board Pin ⑤ of CN262 to the GND for about 1 secont to activate the RF switching position adjustment mode.
2) Check appear "A P" on FL display.
3) Using the channel + and – buttons, adjust to 416 ± 32 µsec (6.5 ± 0.5 H).
4) Press the pause button.

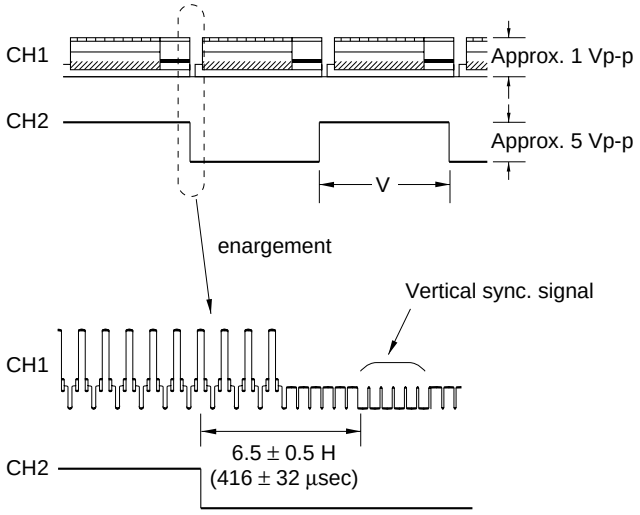


Fig. 7-2-3.

2-4. VIDEO SYSTEM ADJUSTMENT

Adjust the video system in the following sequence as a rule. The color video signal supplied from the pattern generator is used as a video input signal for video system adjustment in the recording mode.

Make sure that sync. and color burst signals meet requirements specified at set up of adjustment shown in Fig. 7-2-1.

[Adjustment Sequence]

2-4-1. Playback Y Signal Level Check
2-4-2. Recording Chroma Level Check
2-4-3. Sync. AGC Check
2-4-4. X'tal Oscillation Frequency Check

2-4-1. Playback Y Signal Level Check (MA-314 Board)

Purpose:

Confirm that the playback Y signal level is correct.

Mode	PB
Signal	Alignment tape SP color bar
Measurement point	Pin ㊳ IC201
Measurement equipment	Oscilloscope
Specified value	2.10 ± 0.18 Vp-p

Confirmation Method:

1) Confirm that the play Y level is 2.10 ± 0.18 Vp-p.

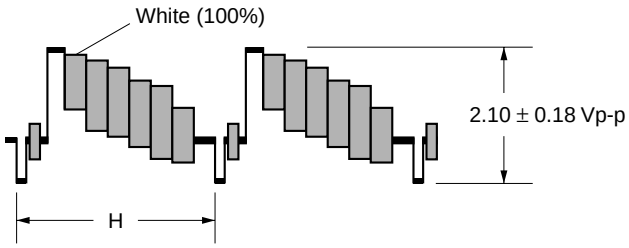


Fig. 7-2-4.

2-4-2. Recording Chroma Level Check (MA-314 Board)

Purpose:
Check the chroma signal level after passing through the Y/C separating circuit.
If shifted, the image is roughened and another color may appear on the edges.

Mode	E-E
Signal	Color bar
Measurement point	Pin ⑭ of IC201
Measurement equipment	Oscilloscope
Specified value	500 ± 80 mVp-p

Confirmation Method:
1) Confirm that the record chroma level is 500 ± 80 mVp-p.

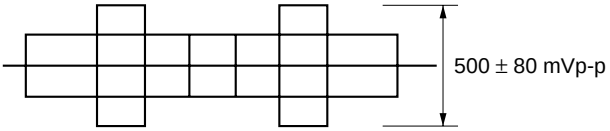


Fig. 7-2-5.

2-4-3. Sync. AGC Check (MA-314 Board)

Purpose:
Confirm that the video level is correct.

Mode	E-E
Signal	Color bar
Measurement point	Pin ㊳ IC201
Measurement equipment	Oscilloscope
Specified value	2.10 ± 0.14 Vp-p

Note: Video output terminal must be terminated at 75 Ω.

Confirmation Method:
1) Confirm that the sync. AGC level is 2.10 ± 0.14 Vp-p.

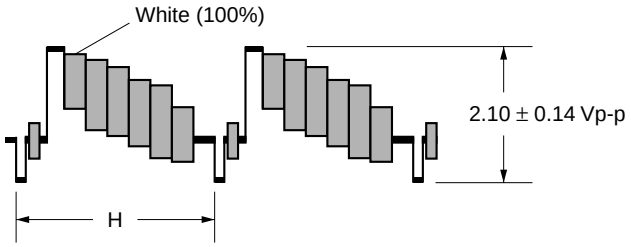


Fig. 7-2-6.

2-4-4. X'tal Oscillation Frequency Check (MA-314)

Purpose:
Confirm that the fsc is correct.

Mode	PB
Signal	Alignment tape SP color bar
Measurement point	Pin ㊾ of IC201
Measurement equipment	Frequency counter, Oscilloscope
Specified value	4,433,619 ± 96 Hz

Note: Connect the frequency counter through a probe of high input impedance (about 10 MΩ) and low capacity (10 pF or less).

Confirmation Method:
1) Confirm that the frequency is 4,433,619 ± 96 Hz
2) Confirm that the amplitude is 500 ± 200 mVp-p.

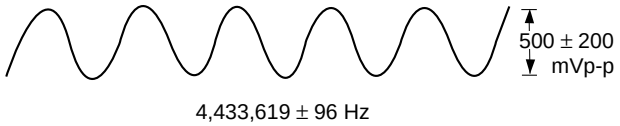


Fig. 7-2-7.

2-5. AUDIO SYSTEM ADJUSTMENTS

• Adjust both Lch and Rch.

[Connection]

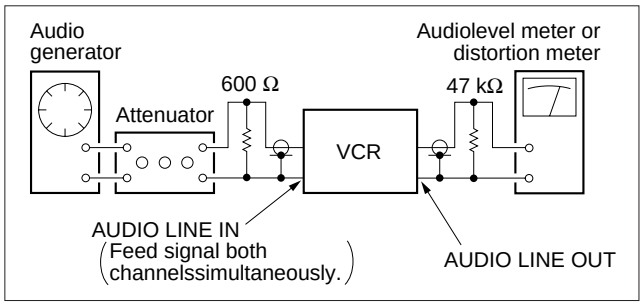


Fig. 7-2-8.

2-5-1. Normal Audio System Adjustment

• Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
• Set AUDIO MONITOR to normal.

[Adjustment Sequence]

1. **ACE Head Adjustment**
2. **E-E Output Level Check**
3. **Frequency Responce Check**
4. **Overall Level Characteristic and Distortion Factor Check**
5. **Overall S/N Check**

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT IV.

2. E-E Output Level Check

Purpose:

Confirm that the output level against the reference input is within the specification.

Mode	E-E
Signal	L, R: 400 Hz, –6.3 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	–6.3 ± 2 dBs

Confirmation Method:

1) Simultaneously input a signal of 400 Hz, –6.3 dBs to both L and R channels of Audio Line Input.
2) Confirm that the audio output level is –6.3 ± 2 dBs.

3. Frequency Responce Check

Purpose:

Confirm that the frequency characteristic is within the specification.

Mode	REC and PB (SP mode)
Signal	400 Hz, –26.3 dBs 7 kHz, –26.3 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Specified value	0 ± 3 dB

Tape path adjustment must have been completed.

Confirmation Method:

1) Supply a signal of 400 Hz, –26.3 dBs to both L and R channels of Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate –26.3 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output level within a range of the 400 Hz playback output level 0 ± 3 dB.

4. Overall Level Characteristic and Distortion Factor Check

Purpose:

Check the record level, play level, and distortion factor against the reference input.

Mode	REC and PB (SP mode)
Signal	400 Hz, –6.3 dBs
Measurement point	Audio output terminal
Measurement equipment	Audio level meter and distortion factor meter
Specified value	Playback level: –6.3 ± 3 dBs Distortion factor: 4% or less

Confirmation Method:

1) Supply an audio signal of 400 Hz, –6.3 dBs simultaneously to both L and R channels of Audio Line Input.
2) Make recording
3) Play back a recorded portion.
4) Confirm that a playback level is –6.3 ± 3 dBs.
5) Confirm that a distortion factor is within 4%.

5. Overall S/N Check

Purpose:

Confirm that the S/N is within the specification.

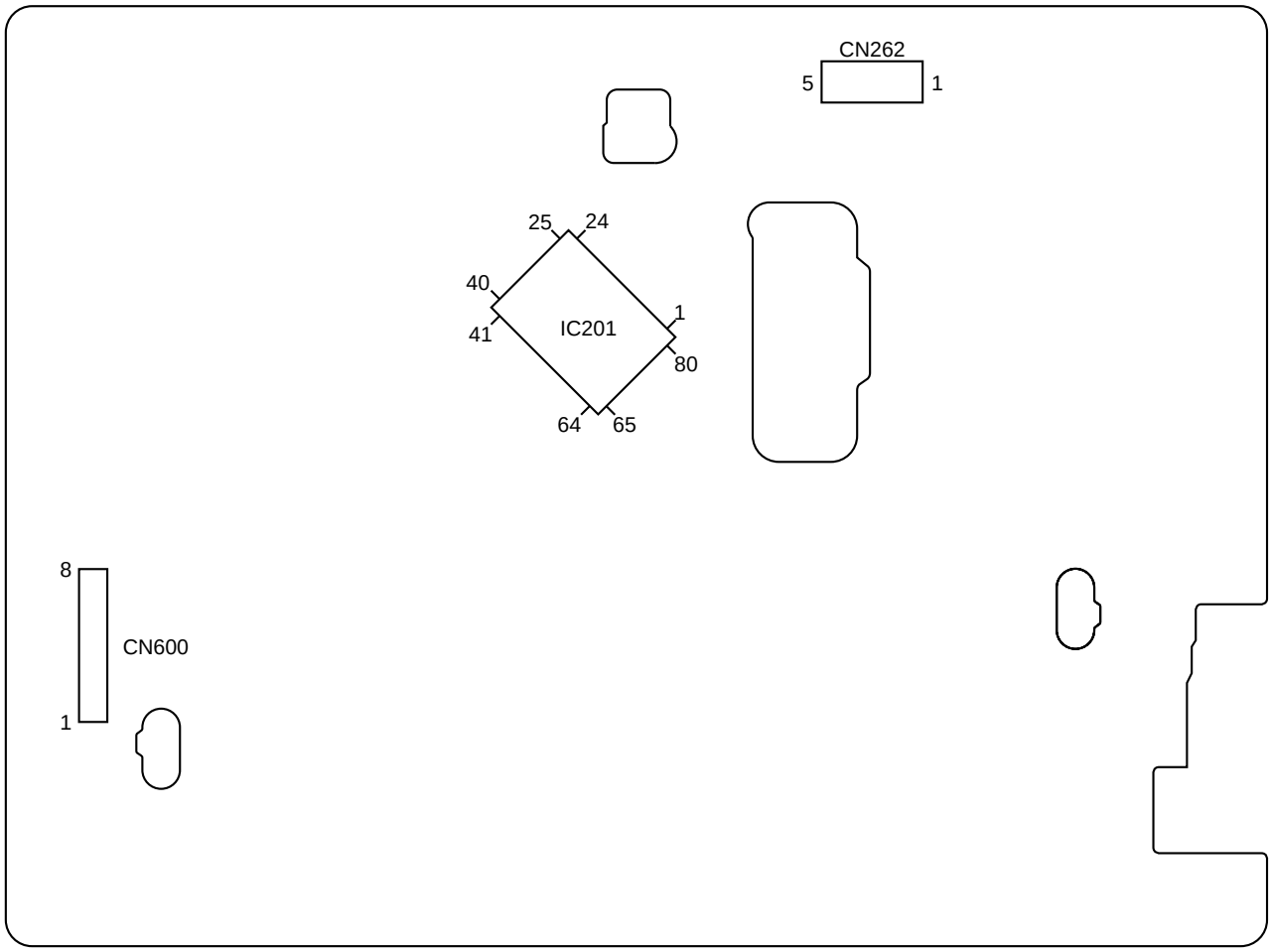
Mode	REC and PB (SP mode)
Signal	Short
Measurement point	Audio output terminal
Measurement equipment	Audio noise meter
Specified value	–38.0 dBs or less

Confirmation Method:

1) Connect both L and R channels of audio line input to the GND.
2) Start recording.
3) Play the recorded part to confirm that the noise is below –38.0 dBs.

2-6. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

MA-314 BOARD (Side B)



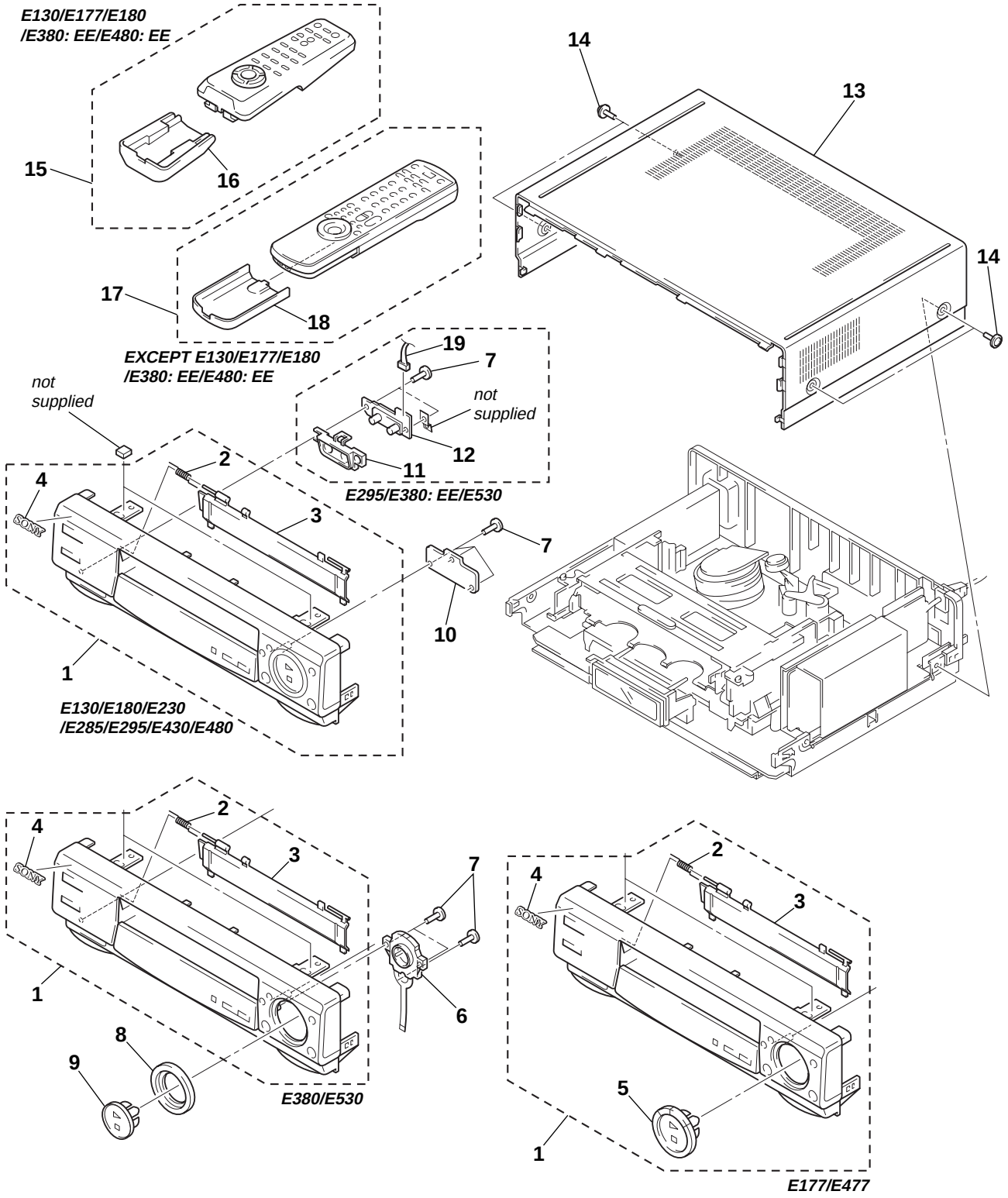
SECTION 8
REPAIR PARTS LIST

8-1. EXPLODED VIEWS

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

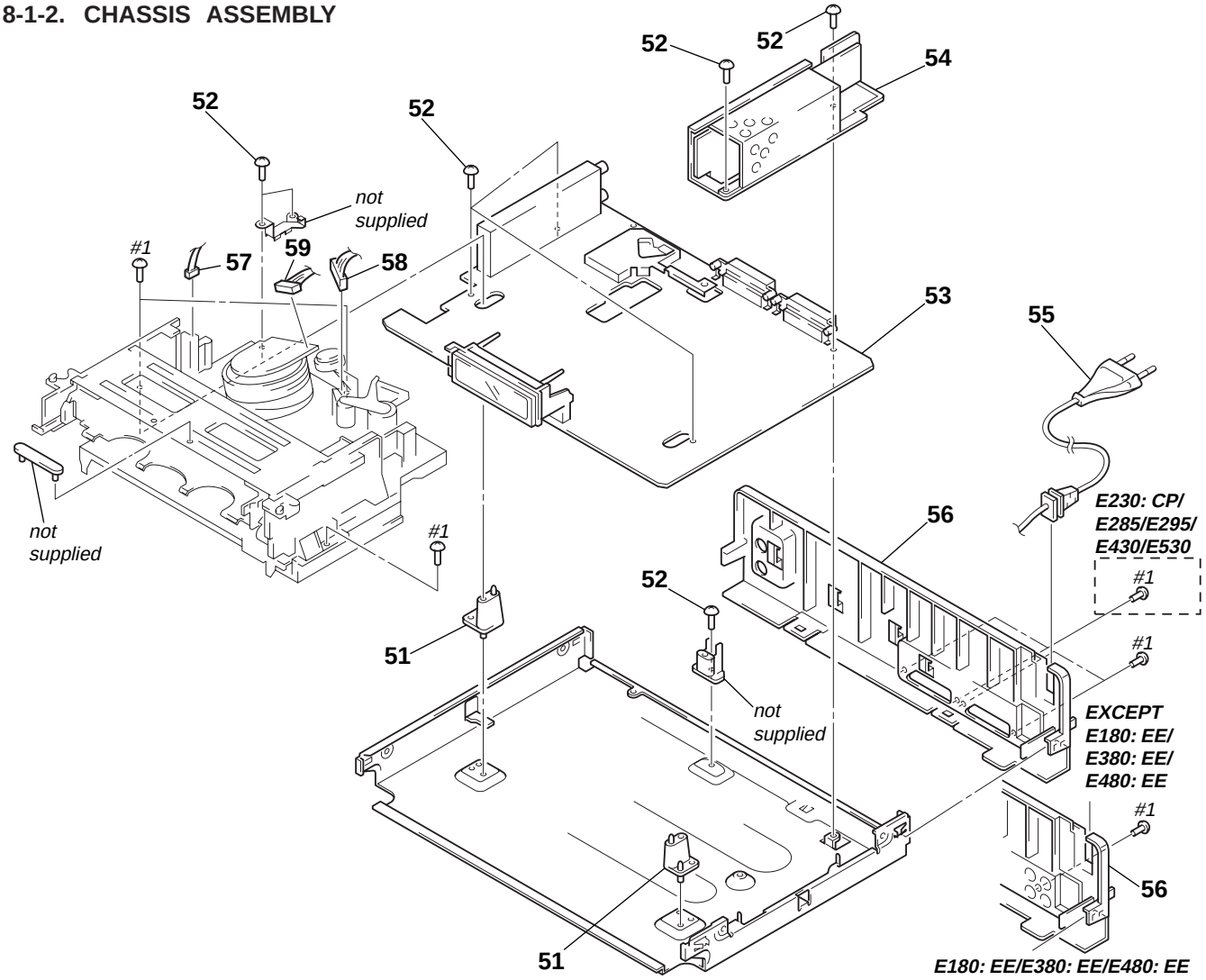
NOTE:
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of the electrical parts list.

8-1-1. FRONT PANEL AND CABINET ASSEMBLIES



Ref. No.	Part No.	Description	Remark
1	X-3948-017-1	PANEL ASSY, FRONT (E530: UX)	
1	X-3948-018-1	PANEL ASSY, FRONT (E530: VC)	
1	X-3948-019-1	PANEL ASSY, FRONT (E530: B)	
1	X-3948-020-1	PANEL ASSY, FRONT (E530: CP)	
1	X-3948-022-1	PANEL ASSY, FRONT (E430: VC, VP)	
1	X-3948-023-1	PANEL ASSY, FRONT (E430: B)	
1	X-3948-024-1	PANEL ASSY, FRONT (E430: AE, CP)	
1	X-3948-025-1	PANEL ASSY, FRONT (E295: UX)	
1	X-3948-026-1	PANEL ASSY, FRONT (E295: CP)	
1	X-3948-027-1	PANEL ASSY, FRONT (E285: B)	
1	X-3948-028-1	PANEL ASSY, FRONT (E230: EY, UY)	
1	X-3948-029-1	PANEL ASSY, FRONT (E230: AE, CP)	
1	X-3948-030-1	PANEL ASSY, FRONT (E130)	
1	X-3948-031-1	PANEL ASSY, FRONT (E480: EG)	
1	X-3948-032-1	PANEL ASSY, FRONT (E380: EG)	
1	X-3948-033-1	PANEL ASSY, FRONT (E180)	
1	X-3948-034-1	PANEL ASSY, FRONT (E480: EE)	
1	X-3948-035-1	PANEL ASSY, FRONT (E380: EE)	
1	X-3948-039-1	PANEL ASSY, FRONT (E295: VC1, VC2)	
1	X-3948-040-1	PANEL ASSY, FRONT (E285: VC)	
1	X-3948-041-1	PANEL ASSY, FRONT (E230: VP1, VP2)	
1	X-3948-042-1	PANEL ASSY, FRONT (E477)	
1	X-3948-043-1	PANEL ASSY, FRONT (E177)	
2	3-953-432-01	SPRING (GE), FL	
3	3-979-467-01	DOOR, CASSETTE (EXCEPT E177/E477)	
3	3-979-467-11	DOOR, CASSETTE (E177/E477)	
4	3-943-995-01	EMBLEM (NO.5), SONY	
5	X-3946-598-1	BUTTON ASSY, FUNCTION (E177/E477)	
6	1-762-844-21	SWITCH, ROTARY (E380/E530)	
7	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
8	3-973-077-11	RING, CHANGE SPEED (E380/E530)	
9	3-972-782-11	BUTTON, CENTER (E380/E530: CP, UX, VC)	
9	3-972-782-41	BUTTON, CENTER (E530: B)	
* 10	A-6794-505-A	DS-78 BOARD, COMPLETE (EXCEPT E380/E530)	
* 10	A-6794-517-A	DS-78 BOARD, COMPLETE (E530)	
* 10	A-6794-518-A	DS-78 BOARD, COMPLETE (E380)	
11	3-979-477-11	COVER, JACK (E295/E380: EE/E530)	
* 12	A-6794-507-A	FI-14 BOARD, COMPLETE (E295/E380: EE/E530)	
* 13	3-979-384-01	CASE, UPPER (E) (EXCEPT E177/E477)	
* 13	3-979-384-11	CASE (E), UPPER (E177/E477)	
14	3-710-901-11	SCREW (TP3X8), CASE	
15	1-475-565-11	COMMANDER, STANDARD (RMT-V220) (E130/E177/E180/E380: EE)	
15	1-475-565-31	COMMANDER, STANDARD (RMT-V220B) (E480: EE)	
16	3-709-322-01	COVER, BATTERY (for RMT-V220/V220B) (E130/E177/E180/E380: EE/E480: EE)	
17	1-475-566-11	COMMANDER, STANDARD (RMT-V221) (E230: AE, CP, VP1, VP2/E285: VC/E380: EG)	
17	1-475-566-21	COMMANDER, STANDARD (RMT-V221A) (E230: EY, UY)	
17	1-475-566-31	COMMANDER, STANDARD (RMT-V221B) (E285: B)	
17	1-475-566-41	COMMANDER, STANDARD (RMT-V221C) (E430: B)	
17	1-475-566-51	COMMANDER, STANDARD (RMT-V221D) (E477)	
17	1-475-566-61	COMMANDER, STANDARD (RMT-V221E) (E430: AE, CP, VC, VP/E480: EG)	
17	1-475-567-11	COMMANDER, STANDARD (RMT-V222) (E295: CP, VC1, VC2/E530: CP, VC)	
17	1-475-567-21	COMMANDER, STANDARD (RMT-V222A) (E295: UX/E530: UX)	
17	1-475-567-31	COMMANDER, STANDARD (RMT-V222B) (E530: B)	
18	3-709-128-01	COVER, BATTERY (for EXCEPT RMT-V220 /V220B) (E230/E285/E295/E380: EG/ E430/E477/E480: EG/E530)	
19	1-958-318-11	HARNES (FR-64) (E295/E380/E530)	

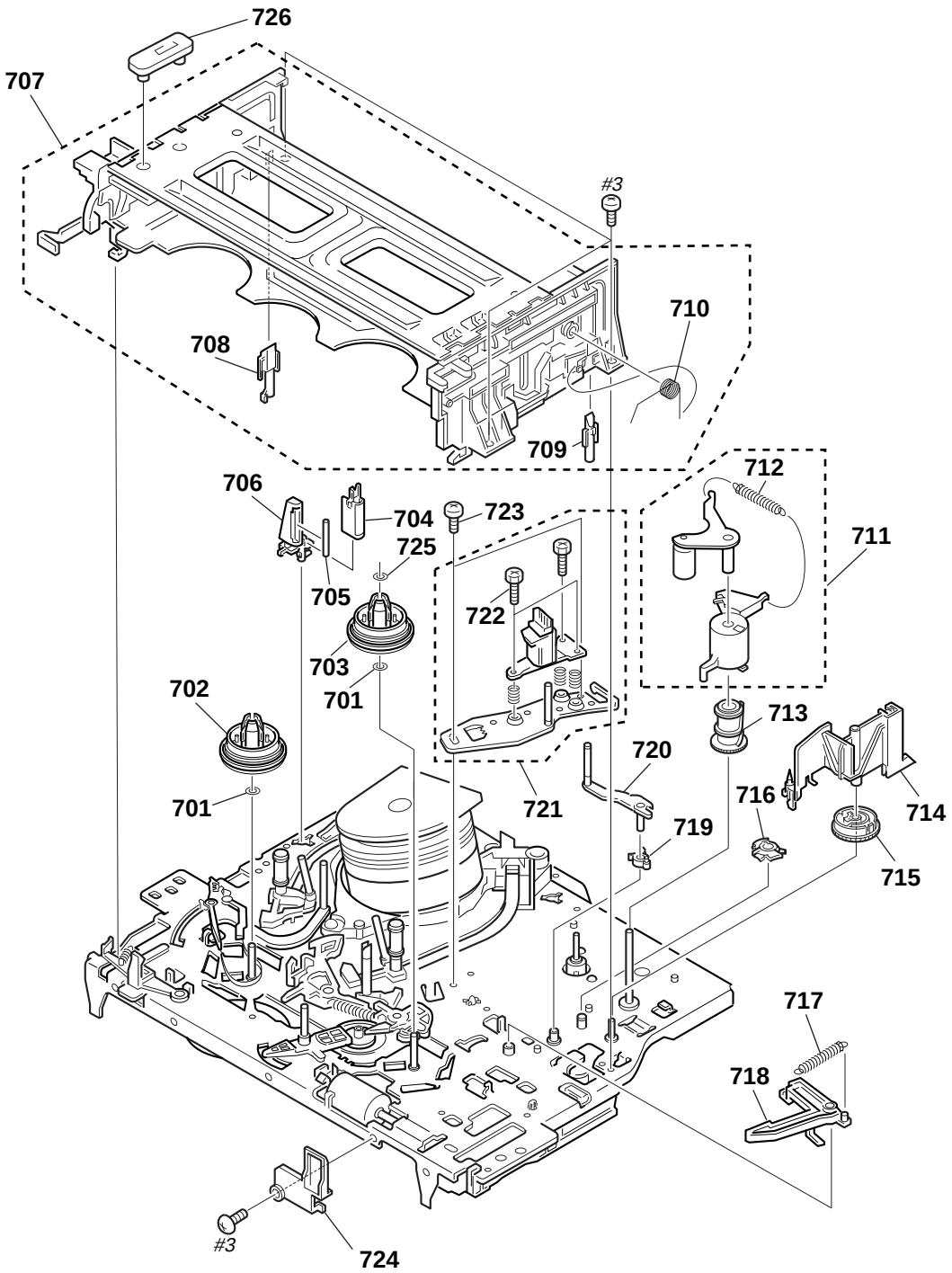
8-1-2. CHASSIS ASSEMBLY



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

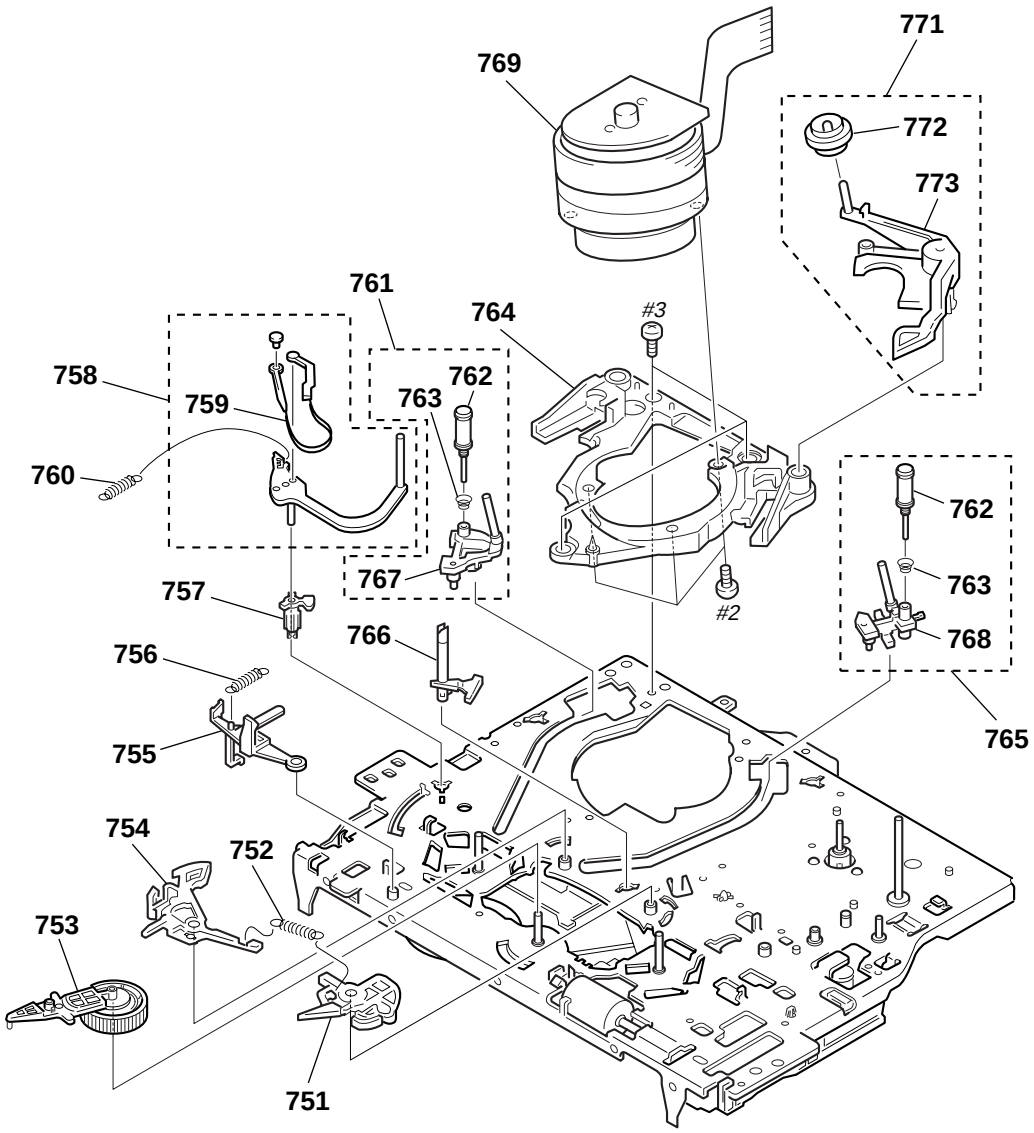
Ref. No.	Part No.	Description	Remark
51	3-959-383-01	BASE (R), MD	
52	3-970-608-21	SUMITITE (B3), +BV	
* 53	A-6791-440-A	MA-314 BOARD, COMPLETE (E230: UY)	
* 53	A-6791-441-A	MA-314 BOARD, COMPLETE (E230: VP1, VP2)	
* 53	A-6791-442-A	MA-314 BOARD, COMPLETE (E285: VC)	
* 53	A-6791-443-A	MA-314 BOARD, COMPLETE (E295: UX)	
* 53	A-6791-444-A	MA-314 BOARD, COMPLETE (E295: VC1, VC2)	
* 53	A-6791-474-A	MA-314 BOARD, COMPLETE (E230: AE)	
* 53	A-6791-475-A	MA-314 BOARD, COMPLETE (E230: CP)	
* 53	A-6791-476-A	MA-314 BOARD, COMPLETE (E285: B)	
* 53	A-6791-477-A	MA-314 BOARD, COMPLETE (E230: EY)	
* 53	A-6791-478-A	MA-314 BOARD, COMPLETE (E130)	
* 53	A-6791-479-A	MA-314 BOARD, COMPLETE (E295: CP)	
* 53	A-6791-508-A	MA-314 BOARD, COMPLETE (E530: UX)	
* 53	A-6791-509-A	MA-314 BOARD, COMPLETE (E530: CP)	
* 53	A-6791-510-A	MA-314 BOARD, COMPLETE (E430: AE)	
* 53	A-6791-511-A	MA-314 BOARD, COMPLETE (E430: VP)	
* 53	A-6791-512-A	MA-314 BOARD, COMPLETE (E530: B)	
* 53	A-6791-513-A	MA-314 BOARD, COMPLETE (E430: CP)	
* 53	A-6791-514-A	MA-314 BOARD, COMPLETE (E430: B)	
* 53	A-6791-515-A	MA-314 BOARD, COMPLETE (E430: VC)	
* 53	A-6791-516-A	MA-314 BOARD, COMPLETE (E530: VC)	
* 53	A-6791-517-A	MA-314 BOARD, COMPLETE (E480: EE)	
* 53	A-6791-518-A	MA-314 BOARD, COMPLETE (E177/E180: EG)	
* 53	A-6791-519-A	MA-314 BOARD, COMPLETE (E180: EE)	
* 53	A-6791-520-A	MA-314 BOARD, COMPLETE (E480: EG)	
* 53	A-6791-521-A	MA-314 BOARD, COMPLETE (E477)	
* 53	A-6791-522-A	MA-314 BOARD, COMPLETE (E380: EG)	
* 53	A-6791-523-A	MA-314 BOARD, COMPLETE (E380: EE)	
54	1-468-271-11	ETXNY 165E1D BLOCK	
⚠55	1-777-854-21	CORD, POWER	
* 56	3-979-382-01	PANEL, REAR (E) (E295: CP, VC1, VC2/E530: B, CP, VC)	
* 56	3-979-382-11	PANEL, REAR (E) (E295: UX/E530: UX)	
* 56	3-979-382-21	PANEL, REAR (E) (E285/E430: B, CP, VC)	
* 56	3-979-382-31	PANEL, REAR (E) (E430: AE, VP)	
* 56	3-979-382-41	PANEL, REAR (E) (E130/E230: AE, EY, UY, VP1, VP2)	
* 56	3-979-382-51	PANEL, REAR (E) (E230: CP)	
* 56	3-979-382-61	PANEL, REAR (E) (E177/E180: EG/E380:EG/E477/E480: EG)	
* 56	3-979-382-71	PANEL, REAR (E) (E180: EE/E380: EE/E480: EE)	
57	1-958-317-11	HARNESS (FE-113)	
58	1-958-316-11	HARNESS (AC-221)	
59	1-958-315-11	HARNESS (DM-129)	

8-1-3. MECHANISM CHASSIS ASSEMBLY (1)



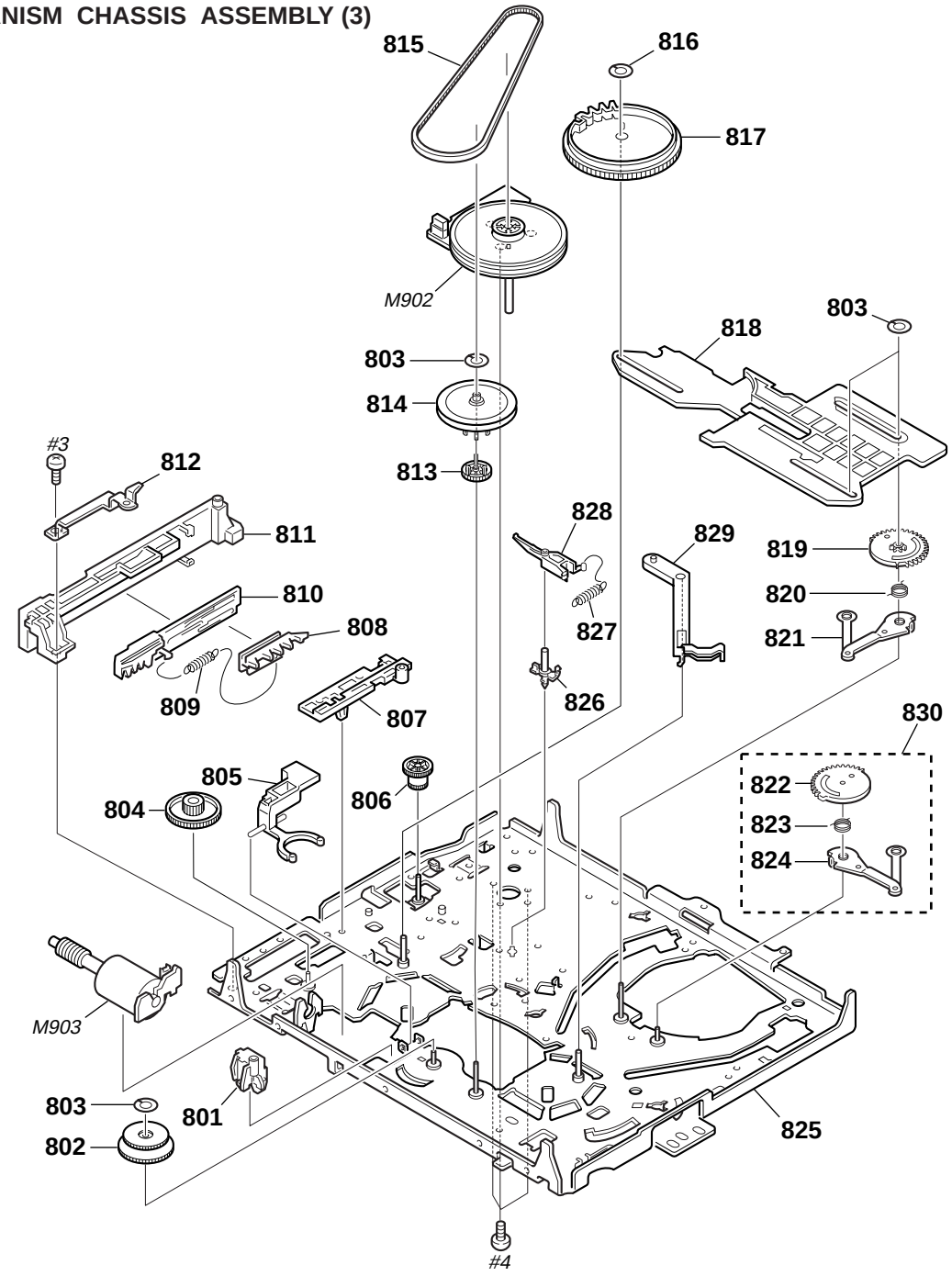
Ref. No.	Part No.	Description	Remark
701	3-977-509-01	WASHER, THRUST	
702	3-977-507-01	TABLE, REEL (S)	
703	3-977-508-01	TABLE, REEL (T)	
704	1-500-144-11	HEAD, FE	
705	3-977-495-01	SHAFT TG2	
706	3-977-494-01	HOLDER, FEH	
707	A-6759-619-C	FL COMPLETE ASSY BOARD, COMPLETE	
708	3-977-535-01	PLATE, LUMINOUS (END SENSOR)	
709	3-977-536-01	PLATE, LUMINOUS (TOP SENSOR)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH	
712	3-958-455-01	SPRING (PINCH), TENSION	
713	3-977-447-01	GEAR, ELEVATOR	
714	3-977-514-01	OPENER, LID	
715	3-977-441-01	GEAR, PINCH PRESSING	
716	3-977-445-01	GEAR, TG8 ARM DRIVING	
717	3-977-465-01	SPRING, EXTENSION (RVS BRAKE)	
718	X-3947-582-1	ARM ASSY, RVS BRAKE	
719	3-977-446-01	GEAR, TG8 ARM	
720	X-3947-590-1	TG8 ASSY	
721	A-6759-620-A	HEAD BLOCK ASSY, ACE (ALPS) EURO	
722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
723	3-979-508-01	SCREW +HEXA TP SW 3X8	
724	3-978-485-01	PLATE, GUIDE CASSETTE	
725	3-977-443-01	WASHER, STOPPER	
726	3-989-036-01	STOPPER, LOCK LEVER (S)	

8-1-4. MECHANISM CHASSIS ASSEMBLY (2)



Ref. No.	Part No.	Description	Remark
751	X-3947-581-1	BRAKE ASSY,MAIN (T)	
752	3-977-462-01	SPRING, EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-2	BRAKE ASSY, MAIN (S)	
755	3-977-513-02	LEVER, REC. PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE	
763	3-965-178-01	SPRING	
764	3-969-632-04	BASE, DRUM	
765	A-6750-325-A	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
767	X-3946-855-1	SHUTTLE (S) ASSY	
768	X-3946-856-1	SHUTTLE (T) ASSY	
769	1-759-183-11	DRUM ASSY, DZH-78A-R (E130/E177/E180/E230: AE, CP, VP2/E285: B/E380)	
769	1-759-522-11	DRUM ASSY, DZH-93A-R (E430/E477/E480/E530)	
769	1-759-523-11	DRUM ASSY, DZH-92A-R (E230: EY, UY, VP1/E285: VC/E295)	
771	A-6746-074-G	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-975-724-07	ARM, HC	

8-1-5. MECHANISM CHASSIS ASSEMBLY (3)



Ref. No.	Part No.	Description	Remark
801	3-977-437-01	RETAINER, CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-02	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	
819	3-977-455-01	GEAR, LOADING (T)	
820	3-977-456-03	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING (T)	
822	3-977-451-01	GEAR, LOADING (S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING (S)	
825	X-3947-576-2	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-02	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
830	A-6759-616-A	GEAR BLOCK ASSY, LOADING (S)	
M902	1-698-971-11	MOTOR, DC (CAPSTAN)	
M903	X-3947-577-1	MOTOR ASSY, CAM	

8-2. ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA. . : µA. . uPA. . : µPA. .
  uPB. . : µPB. . uPC. . : µPC. .
  uPD. . : µPD. .
- CAPACITORS
  uF: µF
- COILS
  uH: µH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-6794-518-A	DS-78 BOARD, COMPLETE (E380)			
*	A-6794-517-A	DS-78 BOARD, COMPLETE (E530)			
*	A-6794-505-A	DS-78 BOARD, COMPLETE (EXCEPT E380/E530)			
		********** (Ref.No. 1,000 Series)			
		< CONNECTOR >			
CN450	1-784-484-11	CONNECTOR, FFC/FPC 5P (E380/E530)			
		< DIODE >			
D450	8-719-946-30	LED SLR34DC3 (JOG) (E530)			
		< JUMPER RESISTOR >			
JR702	1-216-296-91	SHORT	0		
JR704	1-216-296-91	SHORT	0 (E530)		
JR706	1-216-296-91	SHORT	0 (E380/E530)		
JR707	1-216-295-91	SHORT	0		
JR708	1-216-296-91	SHORT	0 (E380/E530)		
JR709	1-216-296-91	SHORT	0 (E380/E530)		
		< RESISTOR >			
R450	1-216-041-00	METAL CHIP	470	5%	1/10W (E530)
R451	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R452	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
		< SWITCH >			
S450	1-571-977-11	SWITCH, TACTIL (FF) (E380/E530)			
S451	1-571-977-11	SWITCH, TACTIL (FF) (EXCEPT E380/E530)			
S452	1-571-977-11	SWITCH, TACTIL (PLAY) (EXCEPT E380/E530)			
S453	1-571-977-11	SWITCH, TACTIL (STOP) (EXCEPT E380/E530)			
S454	1-571-977-11	SWITCH, TACTIL (REW) (EXCEPT E380/E530)			
S455	1-571-977-11	SWITCH, TACTIL (REW) (E380/E530)			
S456	1-571-977-11	SWITCH, TACTIL (JOG) (E530)			
	1-468-271-11	ETXNY 165E1D BLOCK (Ref.No. 2,000 Series) **********			
		< CAPACITOR >			
C003	9-980-236-01	ELECT	47uF		400V
C102	1-126-964-11	ELECT	10uF		50V
C107	1-126-965-11	ELECT	22uF		50V
C201	1-126-968-11	ELECT	100uF		50V
C302	1-126-968-11	ELECT	100uF		50V
C402	1-126-925-11	ELECT	470uF		10V
C501	1-126-960-11	ELECT	1uF		50V
		< DIODE >			
D001	8-719-066-97	DIODE 1N4007			
D002	8-719-066-97	DIODE 1N4007			
D003	8-719-066-97	DIODE 1N4007			
D004	8-719-066-97	DIODE 1N4007			
		< TRANSISTOR >			
Q102	8-729-423-29	TRANSISTOR 2SC3311A-QTA			
*	A-6794-507-A	FI-14 BOARD, COMPLETE (E295/E380EE/E530) ********** (Ref.No. 1,000 Series)			
		< CAPACITOR >			
C481	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C493	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
		< CONNECTOR >			
* CN480	1-568-942-11	PIN, CONNECTOR 4P			
		< DIODE >			
D480	8-719-109-97	DIODE RD6.8ES-B2			
D481	8-719-108-12	DIODE RD9.1E-W			
D491	8-719-108-12	DIODE RD9.1E-W			
		< JACK >			
J481	1-774-510-11	JACK, PIN 2P (LINE 2 IN)			
		< RESISTOR >			
R480	1-216-022-00	METAL CHIP	75	5%	1/10W
R491	1-216-041-00	METAL CHIP	470	5%	1/10W

MA-314

Ref. No.	Part No.	Description	Remark
*	A-6791-478-A	MA-314 BOARD, COMPLETE (E130)	
*	A-6791-518-A	MA-314 BOARD, COMPLETE (E177/E180EG)	
*	A-6791-519-A	MA-314 BOARD, COMPLETE (E180EE)	
*	A-6791-474-A	MA-314 BOARD, COMPLETE (E230AE)	
*	A-6791-475-A	MA-314 BOARD, COMPLETE (E230CP)	
*	A-6791-477-A	MA-314 BOARD, COMPLETE (E230EY)	
*	A-6791-440-A	MA-314 BOARD, COMPLETE (E230UY)	
*	A-6791-441-A	MA-314 BOARD, COMPLETE (E230: VP1,VP2)	
*	A-6791-476-A	MA-314 BOARD, COMPLETE (E285B)	
*	A-6791-442-A	MA-314 BOARD, COMPLETE (E285VC)	
*	A-6791-479-A	MA-314 BOARD, COMPLETE (E295CP)	
*	A-6791-443-A	MA-314 BOARD, COMPLETE (E295UX)	
*	A-6791-444-A	MA-314 BOARD, COMPLETE (E295: VC1,VC2)	
*	A-6791-523-A	MA-314 BOARD, COMPLETE (E380EE)	
*	A-6791-522-A	MA-314 BOARD, COMPLETE (E380EG)	
*	A-6791-510-A	MA-314 BOARD, COMPLETE (E430AE)	
*	A-6791-514-A	MA-314 BOARD, COMPLETE (E430B)	
*	A-6791-513-A	MA-314 BOARD, COMPLETE (E430CP)	
*	A-6791-511-A	MA-314 BOARD, COMPLETE (E430VP)	
*	A-6791-515-A	MA-314 BOARD, COMPLETE (E430VC)	
*	A-6791-521-A	MA-314 BOARD, COMPLETE (E477)	
*	A-6791-517-A	MA-314 BOARD, COMPLETE (E480EE)	
*	A-6791-520-A	MA-314 BOARD, COMPLETE (E480EG)	
*	A-6791-512-A	MA-314 BOARD, COMPLETE (E530B)	
*	A-6791-509-A	MA-314 BOARD, COMPLETE (E530CP)	
*	A-6791-508-A	MA-314 BOARD, COMPLETE (E530UX)	
*	A-6791-516-A	MA-314 BOARD, COMPLETE (E530VC)	
		**********	
			(Ref.No. 1,000 Series)
*	3-960-273-01	SPACER, TOP END	
*	3-960-274-01	SPACER, LED	
		< CAPACITOR >	
C100	1-163-009-11	CERAMIC CHIP 0.001uF 10%	50V
C101	1-163-009-11	CERAMIC CHIP 0.001uF 10%	50V
C102	1-163-251-11	CERAMIC CHIP 100PF 5%	50V
C103	1-163-251-11	CERAMIC CHIP 100PF 5%	50V
C104	1-128-057-11	ELECT 330uF 20%	6.3V
C107	1-124-589-11	ELECT 47uF 20%	16V
C110	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C111	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C112	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C113	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C114	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C117	1-124-589-11	ELECT 47uF 20%	16V
C131	1-124-589-11	ELECT 47uF 20%	16V
C133	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C134	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C162	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C163	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C164	1-124-584-00	ELECT 100uF 20%	10V
C165	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C166	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C167	1-124-584-00	ELECT 100uF 20%	10V
C168	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V
C169	1-104-905-11	CAPACITOR 0.22F	5.5V
C170	1-128-131-11	ELECT 22uF 20%	50V
C171	1-163-009-11	CERAMIC CHIP 0.001uF 10%	50V
C172	1-128-131-11	ELECT 22uF 20%	50V

Ref. No.	Part No.	Description	Remark
C173	1-163-229-11	CERAMIC CHIP 12PF 5%	50V
C174	1-164-161-11	CERAMIC CHIP 0.0022uF 10%	100V
C175	1-163-227-11	CERAMIC CHIP 10PF 0.5PF	50V
C176	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C177	1-128-131-11	ELECT 22uF 20%	50V
C178	1-163-099-00	CERAMIC CHIP 18PF 5%	50V
C179	1-124-584-00	ELECT 100uF 20%	10V
C180	1-163-235-11	CERAMIC CHIP 22PF 5%	50V
C181	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C182	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C184	1-163-007-11	CERAMIC CHIP 680PF 10%	50V
C185	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C201	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C202	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C204	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C205	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V
C206	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C207	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C208	1-163-241-11	CERAMIC CHIP 39PF 5%	50V
C209	1-128-131-11	ELECT 22uF 20%	50V
C210	1-163-131-00	CERAMIC CHIP 390PF 5%	50V
C211	1-163-237-11	CERAMIC CHIP 27PF 5%	50V
			(E430/E477/E480/E530)
C211	1-163-239-11	CERAMIC CHIP 33PF 5%	50V
			(E130/E177/E180/E230/E285/E295/E380)
C213	1-163-259-91	CERAMIC CHIP 220PF 5%	50V
C215	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C217	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C218	1-163-243-11	CERAMIC CHIP 47PF 5%	50V
			(EXCEPT E180EE/E380EE/E480EE)
C219	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C220	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C221	1-163-038-11	CERAMIC CHIP 0.1uF	25V
			(E295/E380EE/E430: AE,VP/E530)
C222	1-163-243-11	CERAMIC CHIP 47PF 5%	50V
			(E430: AE, VP)
C223	1-124-589-11	ELECT 47uF 20%	16V
C224	1-164-159-11	CERAMIC 0.1uF	50V
C226	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C227	1-163-259-91	CERAMIC CHIP 220PF 5%	50V
C228	1-126-157-11	ELECT 10uF 20%	16V
C229	1-164-159-11	CERAMIC 0.1uF	50V
C230	1-126-967-11	ELECT 47uF 20%	16V
C231	1-126-157-11	ELECT 10uF 20%	16V
C232	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C233	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C234	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C235	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C236	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C237	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C238	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C239	1-126-967-11	ELECT 47uF 20%	16V
C240	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C241	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V
C242	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C243	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C244	1-163-038-11	CERAMIC CHIP 0.1uF	25V
C245	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
C246	1-109-982-11	CERAMIC CHIP 1uF 10%	10V
C247	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V

Ref. No.	Part No.	Description			Remark
C248	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C249	1-126-967-11	ELECT	47uF	20%	16V
C250	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C251	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C252	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C253	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C255	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C256	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C260	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C261	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
					(E430/E477/E480/E530)
C264	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C265	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
					(E430/E477/E480/E530)
C266	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C267	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C268	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C269	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C270	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C271	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C272	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
					(E430/E477/E480/E530)
C272	1-164-232-11	CERAMIC CHIP	0.01uF		50V
					(E130/E177/E180/E230/E285/E295/E380)
C273	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
					(E430/E477/E480/E530)
C273	1-216-025-91	RES, CHIP	100	5%	1/10W
					(E130/E177/E180/E230/E285/E295/E380)
C274	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
					(E430/E477/E480/E530)
C276	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C277	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C278	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
					(E430/E477/E480/E530)
C279	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
					(E430/E477/E480/E530)
C280	1-124-584-00	ELECT	100uF	20%	10V
C281	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C282	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C283	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C284	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C286	1-124-584-00	ELECT	100uF	20%	10V
C287	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C288	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C289	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C301	1-164-159-11	CERAMIC	0.1uF		50V
C302	1-124-589-11	ELECT	47uF	20%	16V
C303	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C304	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
					(E295/E380EE/E430: AE,VP/E530)
C305	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C306	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C307	1-126-157-11	ELECT	10uF	20%	16V
C308	1-124-589-11	ELECT	47uF	20%	16V
C309	1-126-963-11	ELECT	4.7uF	20%	50V
C310	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C311	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C312	1-137-370-11	FILM	0.01uF	5%	50V
C313	1-126-157-11	ELECT	10uF	20%	16V
C314	1-164-232-11	CERAMIC CHIP	0.01uF		50V

Ref. No.	Part No.	Description			Remark
C315	1-126-160-11	ELECT	1uF	20%	50V
C317	1-126-163-11	ELECT	4.7uF	20%	50V
C318	1-124-589-11	ELECT	47uF	20%	16V
C321	1-124-589-11	ELECT	47uF	20%	16V
C322	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C323	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C324	1-137-397-11	FILM	0.047uF	5%	100V
C400	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C421	1-163-038-11	CERAMIC CHIP	0.1uF		25V
C422	1-124-589-11	ELECT	47uF	20%	16V
C423	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C424	1-124-589-11	ELECT	47uF	20%	16V
C500	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
					(EXCEPT E180EE/E380EE/E480EE)
C510	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C511	1-124-589-11	ELECT	47uF	20%	16V
C512	1-124-589-11	ELECT	47uF	20%	16V
C513	1-126-935-11	ELECT	470uF	20%	6.3V
C530	1-124-589-11	ELECT	47uF	20%	16V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C531	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C532	1-126-933-11	ELECT	100uF	20%	16V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C541	1-124-584-00	ELECT	100uF	20%	10V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C542	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C543	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C544	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C545	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C546	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C547	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C548	1-162-215-21	CAP, CERAMIC	47PF	5%	50V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C571	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
					(E230CP/E285/E295/E430/E530)
C572	1-124-261-00	ELECT	10uF	20%	50V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
C580	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C581	1-126-964-11	ELECT	10uF	20%	50V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C582	1-124-261-00	ELECT	10uF	20%	50V
					(E230CP/E285/E295/E430: B, CP, VC/E530)
C583	1-124-261-00	ELECT	10uF	20%	50V
					(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)

Ref. No.	Part No.	Description			Remark
C584	1-126-964-11	ELECT	10uF	20%	50V
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
C585	1-124-261-00	ELECT	10uF	20%	50V
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
C586	1-124-261-00	ELECT	10uF	20%	50V
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
C587	1-126-960-11	ELECT	1uF	20%	50V
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
C600	1-128-131-11	ELECT	22uF	20%	50V
C601	1-128-131-11	ELECT	22uF	20%	50V
C602	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C603	1-124-589-11	ELECT	47uF	20%	16V
C605	1-128-131-11	ELECT	22uF	20%	50V
C606	1-124-589-11	ELECT	47uF	20%	16V
C607	1-124-248-00	ELECT	22uF	20%	35V
C608	1-124-248-00	ELECT	22uF	20%	35V
C610	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
C660	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C661	1-124-589-11	ELECT	47uF	20%	16V
C662	1-137-372-11	FILM	0.022uF	5%	50V
C663	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C666	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C667	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C668	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C669	1-130-481-00	MYLAR	0.0068uF	5%	50V
C670	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C672	1-126-160-11	ELECT	1uF	20%	50V
C673	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
		(E177/E180/E285B/E380/E430B/E477/E480/E530B)			
C674	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C675	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C676	1-124-589-11	ELECT	47uF	20%	16V
C677	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C701	1-126-964-11	ELECT	10uF	20%	50V
C704	1-126-964-11	ELECT	10uF	20%	50V
C705	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C708	1-126-967-11	ELECT	47uF	20%	16V
C709	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C710	1-128-131-11	ELECT	22uF	20%	50V
C750	1-126-933-11	ELECT	100uF	20%	16V
C751	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C752	1-126-933-11	ELECT	100uF	20%	16V
C753	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
C754	1-126-924-11	ELECT	330uF	20%	10V
		(EXCEPT E180EE/E380EE/E480EE)			
C755	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(EXCEPT E180EE/E380EE/E480EE)			
C850	1-163-038-11	CERAMIC CHIP	0.1uF		25V
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
C851	1-126-157-11	ELECT	10uF	20%	16V
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
C852	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
C853	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
C855	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
C856	1-163-038-11	CERAMIC CHIP	0.1uF		25V
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
C970	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
		(E285B/E430B/E530B)			
C971	1-124-257-00	ELECT	2.2uF	20%	50V
		(E285B/E430B/E530B)			
C972	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
		(E285B/E430B/E530B)			
C973	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C974	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
		(E285B/E430B/E530B)			
C975	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
		(E285B/E430B/E530B)			
C976	1-163-259-91	CERAMIC CHIP	220PF	5%	50V
		(E285B/E430B/E530B)			
C977	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C978	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
		(E285B/E430B/E530B)			
C979	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
		(E285B/E430B/E530B)			
C980	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
		(E285B/E430B/E530B)			
C981	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C982	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
		(E285B/E430B/E530B)			
C983	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
		(E285B/E430B/E530B)			
C984	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C985	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
		(E285B/E430B/E530B)			
C986	1-126-157-11	ELECT	10uF	20%	16V
		(E285B/E430B/E530B)			
C987	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
		(E285B/E430B/E530B)			
C988	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
		(E285B/E430B/E530B)			
C991	1-107-725-11	CERAMIC CHIP	0.1uF	10%	16V
		(E285B/E430B/E530B)			
C992	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C993	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C994	1-164-232-11	CERAMIC CHIP	0.01uF		50V
		(E285B/E430B/E530B)			
C995	1-126-157-11	ELECT	10uF	20%	16V
		(E285B/E430B/E530B)			
C996	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
		(E285B/E430B/E530B)			

Ref. No.	Part No.	Description	Remark
		< CONNECTOR >	
* CN101	1-568-954-11	PIN, CONNECTOR 5P	
CN102	1-779-723-11	CONNECTOR, BOARD TO BOARD 9P	
CN104	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P	
CN161	1-506-469-11	PIN, CONNECTOR 4P (E295/E380EE/E530)	
CN162	1-506-468-11	PIN, CONNECTOR 3P	
CN163	1-506-469-11	PIN, CONNECTOR 4P (EXCEPT E380/E530)	
* CN163	1-568-936-11	PIN, CONNECTOR 9P (E380/E530)	
CN260	1-784-487-11	CONNECTOR, FFC/FPC 8P	
* CN262	1-560-893-00	PIN, CONNECTOR 5P	
CN301	1-506-469-11	PIN, CONNECTOR 4P	
CN302	1-506-468-11	PIN, CONNECTOR 3P	
* CN500	1-695-935-11	CONNECTOR (SQUARE TYPE) 21P (LINE 1 (TV)) (EXCEPT E180EE/E380EE/E480EE)	
* CN570	1-695-935-11	CONNECTOR (SQUARE TYPE) 21P (LINE 3) (E230CP/E285/E295/E430/E530)	
CN600	1-569-667-11	CONNECTOR, BOARD TO BOARD 8P	
		< JACK >	
CNJ500	1-779-010-11	JACK, PIN 4P (LINE 1 IN/LINE OUT) (E180EE/E380EE/E480EE)	
		< DIODE >	
D101	8-719-200-82	DIODE 11ES2	
D102	8-719-048-26	DIODE GL528V1	
D104	8-719-200-82	DIODE 11ES2	
D161	8-719-200-82	DIODE 11ES2 (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)	
D162	8-719-056-07	DIODE SLR-342MCT31 (ON/STANDBY)	
D163	8-719-200-82	DIODE 11ES2	
D164	8-719-200-82	DIODE 11ES2	
D165	8-719-109-97	DIODE RD6.8ES-B2	
D166	8-719-109-97	DIODE RD6.8ES-B2	
D401	8-719-109-97	DIODE RD6.8ES-B2	
D500	8-719-109-97	DIODE RD6.8ES-B2	
D501	8-719-109-97	DIODE RD6.8ES-B2	
D504	8-719-109-97	DIODE RD6.8ES-B2	
D505	8-719-109-97	DIODE RD6.8ES-B2	
D511	8-719-109-97	DIODE RD6.8ES-B2 (EXCEPT E180EE/E380EE/E480EE)	
D512	8-719-921-86	DIODE MTZJ-13 (EXCEPT E180EE/E380EE/E480EE)	
D513	8-719-109-97	DIODE RD6.8ES-B2 (EXCEPT E180EE/E380EE/E480EE)	
D514	8-719-109-97	DIODE RD6.8ES-B2 (EXCEPT E180EE/E380EE/E480EE)	
D515	8-719-109-97	DIODE RD6.8ES-B2 (EXCEPT E180EE/E380EE/E480EE)	
D516	8-719-109-97	DIODE RD6.8ES-B2 (EXCEPT E180EE/E380EE/E480EE)	
D517	8-719-109-97	DIODE RD6.8ES-B2	
D540	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430/E530)	
D541	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430/E530)	
D542	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)	
D543	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)	
D544	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)	
D545	8-719-109-97	DIODE RD6.8ES-B2	
D571	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430/E530)	
D572	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430/E530)	
D575	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430: B, CP, VC/E530)	
D576	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430: B, CP, VC/E530)	
D579	8-719-109-97	DIODE RD6.8ES-B2 (E230CP/E285/E295/E430/E530)	
D580	8-719-911-19	DIODE 1SS119	
D581	8-719-911-19	DIODE 1SS119	
D582	8-719-109-97	DIODE RD6.8ES-B2	
D583	8-719-109-97	DIODE RD6.8ES-B2	
D600	8-719-911-19	DIODE 1SS119	
D601	8-719-911-19	DIODE 1SS119	
D602	8-719-109-85	DIODE RD5.1ES-B2	
D661	8-719-911-19	DIODE 1SS119	
D662	8-719-911-19	DIODE 1SS119	
D702	8-719-982-26	DIODE MTZJ-33B	
D703	8-719-109-97	DIODE RD6.8ES-B2	
D751	8-719-109-85	DIODE RD5.1ES-B2	
D752	8-719-911-19	DIODE 1SS119	
		< FILTER >	
FL500	1-236-163-11	ENCAPSULATED COMPONENT	
FL502	1-236-163-11	ENCAPSULATED COMPONENT	
FL570	1-236-163-11	ENCAPSULATED COMPONENT (E230CP/E285/E295/E430/E530)	
FL572	1-236-163-11	ENCAPSULATED COMPONENT (E230CP/E285/E295/E430: B, CP, VC/E530)	
FL660	1-233-527-11	FILTER, TRAP	
		< IC >	
IC130	8-759-481-46	IC LB1943	
IC161	8-759-482-27	IC M37777MAA104GP (E230/E285B/E295/E380EG/E430/ E480EG/E530: CP, UX, VC)	
IC161	8-759-495-33	IC M37777MAA105GP (E130/E177/E180EG/E477)	
IC161	8-759-482-29	IC M37777M7A238GP-C (E180EE/E380EE/E480EE)	
IC161	8-759-534-75	IC M37777MAA106GP (E285VC/E530B)	
IC162	8-759-248-87	IC MM1256XF-BE	
IC163	8-759-432-32	IC ST24W04FM6TR	
IC163	8-759-432-33	IC ST24W08FM6TR	
IC163	8-759-518-23	IC X24C04S8	
IC163	8-759-454-78	IC 24LC08BT/SN	
IC201	8-759-479-25	IC LA71514M-MPB	
IC202	8-759-439-50	IC LC89977M-TE-L	
IC260	8-759-352-17	IC HA118195NT (E430/E477/E480/E530)	
IC260	8-759-357-84	IC HA118295NT (E130/E177/E180/E230/E285/E295/E380)	

Ref. No.	Part No.	Description	Remark
IC301	8-759-499-30	IC BA7755AF-E2	
IC400	8-742-042-00	HY B IC SBX1986-51	
IC420	8-759-366-44	IC uPD16312GB-3B4	
⚠IC530	8-759-438-18	IC PQ12RD08 (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)	
IC540	8-759-438-16	IC STV6400D (E230CP/E285/E295/E430: B, CP, VC/E530)	
IC580	8-759-300-71	IC HD14053BFP (E230CP/E285/E295/E430: B, CP, VC/E530)	
⚠IC600	8-759-438-18	IC PQ12RD08	
IC660	8-759-480-27	IC LC74790M-9693-TLM (E130/E230/E285/E295/E430/E530)	
IC660	8-759-480-26	IC LC74790M-9702-TLM (E177/E180/E380/E477/E480)	
IC850	8-759-484-61	IC SDA5650X-GEG (E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)	
IC970	8-759-438-17	IC LA7337 (E285B/E430B/E530B)	
		< JUMPER RESISTOR >	
JR001	1-216-296-91	SHORT 0	
JR002	1-216-295-91	SHORT 0	
JR003	1-216-295-91	SHORT 0 (E530)	
JR004	1-216-296-91	SHORT 0	
JR005	1-216-296-91	SHORT 0 (E530)	
JR006	1-216-296-91	SHORT 0	
JR007	1-216-296-91	SHORT 0	
JR008	1-216-296-91	SHORT 0	
JR009	1-216-296-91	SHORT 0	
JR010	1-216-296-91	SHORT 0	
JR011	1-216-296-91	SHORT 0 (E295/E380EE/E530)	
JR012	1-216-296-91	SHORT 0	
JR013	1-216-295-91	SHORT 0	
JR014	1-216-296-91	SHORT 0	
JR015	1-216-296-91	SHORT 0	
JR016	1-216-296-91	SHORT 0	
JR017	1-216-296-91	SHORT 0	
JR018	1-216-296-91	SHORT 0	
JR019	1-216-296-91	SHORT 0	
JR020	1-216-296-91	SHORT 0 (E295/E380EE/E530)	
JR021	1-216-296-91	SHORT 0 (E230CP/E285/E295/E430/E530)	
JR022	1-216-296-91	SHORT 0 (E230CP/E285/E295/E430/E530)	
JR023	1-216-296-91	SHORT 0	
JR024	1-216-295-91	SHORT 0	
JR025	1-216-296-91	SHORT 0 (E230CP/E285/E295/E430: B, CP, VC/E530)	
JR026	1-216-296-91	SHORT 0	
JR027	1-216-295-91	SHORT 0	
JR028	1-216-295-91	SHORT 0 (E285B/E430B/E530B)	
JR029	1-216-296-91	SHORT 0	
JR030	1-216-296-91	SHORT 0	
JR031	1-216-296-91	SHORT 0	
JR032	1-216-296-91	SHORT 0	
JR033	1-216-295-91	SHORT 0	
JR034	1-216-296-91	SHORT 0	
JR036	1-216-296-91	SHORT 0	
JR037	1-216-295-91	SHORT 0	
JR038	1-216-296-91	SHORT 0	
JR039	1-216-296-91	SHORT 0	
JR040	1-216-296-91	SHORT 0	
JR041	1-216-296-91	SHORT 0	
JR042	1-216-296-91	SHORT 0 (E285B/E430B/E530B)	
JR043	1-216-295-91	SHORT 0 (E285B/E430B/E530B)	
JR044	1-216-296-91	SHORT 0 (E285B/E430B/E530B)	
JR045	1-216-296-91	SHORT 0	
JR046	1-216-296-91	SHORT 0	
JR047	1-216-295-91	SHORT 0	
JR048	1-216-295-91	SHORT 0	
JR049	1-216-296-91	SHORT 0	
JR050	1-216-296-91	SHORT 0	
JR051	1-216-296-91	SHORT 0	
JR052	1-216-296-91	SHORT 0	
JR053	1-216-296-91	SHORT 0	
JR054	1-216-296-91	SHORT 0	
JR055	1-216-296-91	SHORT 0	
JR056	1-216-296-91	SHORT 0	
JR057	1-216-296-91	SHORT 0 (E285B/E430B/E530B)	
JR058	1-216-295-91	SHORT 0	
JR059	1-216-296-91	SHORT 0	
JR060	1-216-295-91	SHORT 0	
JR061	1-216-296-91	SHORT 0 (E285B/E430B/E530B)	
JR062	1-216-296-91	SHORT 0	
JR063	1-216-296-91	SHORT 0 (E285B/E430B/E530B)	
JR064	1-216-296-91	SHORT 0	
JS541	1-216-296-91	SHORT 0 (E130/E177/E180/E230: AE, EY, UY, VP1, VP2/ E380/E430: AE, VP/E477/E480)	
JS572	1-216-296-91	SHORT 0 (E130/E177/E180/E230: AE, EY, UY, VP1, VP2/ E295UX/E380/E430: AE, VP/E477/E480/E530UX)	
JS573	1-216-296-91	SHORT 0 (E130/E177/E180/E230: AE, EY, UY, VP1, VP2/ E380/E430: AE, VP/E477/E480)	
JS750	1-216-295-91	SHORT 0 (EXCEPT E180EE/E380EE/E480EE)	
JS751	1-216-295-91	SHORT 0 (E180EE/E380EE/E480EE)	
		< COIL >	
L161	1-414-936-21	INDUCTOR 22uH	
L162	1-414-936-21	INDUCTOR 22uH	
L163	1-414-936-21	INDUCTOR 22uH	
L164	1-414-936-21	INDUCTOR 22uH	
L201	1-414-946-21	INDUCTOR 39uH	
L202	1-414-940-21	INDUCTOR 100uH	
L204	1-414-934-21	INDUCTOR 10uH	
L205	1-414-940-21	INDUCTOR 100uH	
L206	1-414-934-21	INDUCTOR 10uH	
L207	1-414-934-21	INDUCTOR 10uH	
L208	1-469-014-21	INDUCTOR 120uH	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
L262	1-414-940-21	INDUCTOR 100uH	
L263	1-414-940-21	INDUCTOR 100uH	
L301	1-414-940-21	INDUCTOR 100uH	
L321	1-414-940-21	INDUCTOR 100uH	
L510	1-414-940-21	INDUCTOR 100uH	
L530	1-414-940-21	INDUCTOR 100uH	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
L540	1-414-934-21	INDUCTOR 10uH	(E230CP/E285/E295/E430: B, CP, VC/E530)
L580	1-414-940-21	INDUCTOR 100uH	(E230CP/E285/E295/E430: B, CP, VC/E530)
L600	1-414-939-21	INDUCTOR 68uH	
L601	1-414-934-21	INDUCTOR 10uH	
L661	1-414-940-21	INDUCTOR 100uH	
L662	1-414-936-21	INDUCTOR 22uH	(E177/E180/E285B/E380/E430B/E477/E480/E530B)
L663	1-414-940-21	INDUCTOR 100uH	
L701	1-414-930-21	INDUCTOR 2.2uH	
L750	1-414-930-21	INDUCTOR 2.2uH	
L751	1-414-930-21	INDUCTOR 2.2uH	(EXCEPT E180EE/E380EE/E480EE)
L970	1-414-933-11	INDUCTOR 6.8uH(E285B/E430B/E530B)	
L971	1-414-945-11	INDUCTOR 27uH (E285B/E430B/E530B)	
L972	1-414-938-21	INDUCTOR 47uH (E285B/E430B/E530B)	
L973	1-414-938-21	INDUCTOR 47uH (E285B/E430B/E530B)	
L975	1-414-934-21	INDUCTOR 10uH (E285B/E430B/E530B)	
		< FLUORECENT INDICATOR >	
ND420	1-517-724-11	TUBE, FLUORESCENT INDICATOR	
		< PHOTO INTERRUPTER >	
PH100	8-749-013-23	PHOTO INTERRUPTER GP3S120	
PH101	8-749-013-23	PHOTO INTERRUPTER GP3S120	
		< IC LINK >	
⚠PS100	1-533-586-31	LINK, IC 491.315 (315mA)	
⚠PS131	1-533-586-31	LINK, IC 491.315 (315mA)	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CO, VC)
⚠PS600	1-533-593-11	LINK, IC 491002 (2A)	
⚠PS601	1-533-589-21	LINK, IC 491.750 (750mA)	
		< TRANSISTOR >	
Q100	8-729-043-84	TRANSISTOR PT380F3	
Q101	8-729-043-84	TRANSISTOR PT380F3	
Q102	8-729-281-53	TRANSISTOR 2SC1815-GR	
Q161	8-729-804-41	TRANSISTOR 2SB1122-S	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
Q162	8-729-421-19	TRANSISTOR UN2213	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
Q163	8-729-421-19	TRANSISTOR UN2213	
Q201	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q202	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q208	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q209	8-729-216-22	TRANSISTOR 2SA1162	
Q210	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q211	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q260	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q301	8-729-281-53	TRANSISTOR 2SC1815-GR	
Q321	8-729-802-91	TRANSISTOR 2SD879	
Q501	8-729-424-08	TRANSISTOR UN2111	(EXCEPT E180EE/E380EE/E480EE)
Q502	8-729-421-19	TRANSISTOR UN2213	(EXCEPT E180EE/E380EE/E480EE)
Q503	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q510	8-729-216-22	TRANSISTOR 2SA1162	
Q540	8-729-216-22	TRANSISTOR 2SA1162	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
Q580	8-729-422-27	TRANSISTOR 2SD601A-Q	(E230CP/E285/E295/E430: B, CP, VC/E530)
Q581	8-729-421-19	TRANSISTOR UN2213	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
Q582	8-729-421-19	TRANSISTOR UN2213	(E230CP/E285/E295/E430: B, CP, VC/E530)
Q583	8-729-421-19	TRANSISTOR UN2213	(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
⚠Q600	8-729-140-93	TRANSISTOR 2SB733-34	
Q601	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q602	8-729-018-99	TRANSISTOR 2SD2394-F	
Q603	8-729-140-96	TRANSISTOR KSC1008	(EXCEPT E180EE/E380EE/E480EE)
Q604	8-729-424-08	TRANSISTOR UN2111	(EXCEPT E180EE/E380EE/E480EE)
Q605	8-729-421-19	TRANSISTOR UN2213	(EXCEPT E180EE/E380EE/E480EE)
Q606	8-729-119-79	TRANSISTOR 2SC2785-FEK	
Q660	8-729-216-22	TRANSISTOR 2SA1162	
Q661	8-729-216-22	TRANSISTOR 2SA1162	
Q662	8-729-216-22	TRANSISTOR 2SA1162	
Q750	8-729-012-31	TRANSISTOR 2SC4040-TL2-Q	
Q751	8-729-421-19	TRANSISTOR UN2213	(EXCEPT E180EE/E380EE/E480EE)
Q752	8-729-216-22	TRANSISTOR 2SA1162	(EXCEPT E180EE/E380EE/E480EE)
Q850	8-729-216-22	TRANSISTOR 2SA1162	(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)
Q970	8-729-216-22	TRANSISTOR 2SA1162	(E285B/E430B/E530B)
Q972	8-729-424-08	TRANSISTOR UN2111	(E285B/E430B/E530B)
Q973	8-729-422-27	TRANSISTOR 2SD601A-Q	(E285B/E430B/E530B)
Q974	8-729-422-27	TRANSISTOR 2SD601A-Q	(E285B/E430B/E530B)
Q975	8-729-424-08	TRANSISTOR UN2111	(E285B/E430B/E530B)

The components identified by mark ⚠or dotted line with mark ⚠are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
Q976	8-729-421-19	TRANSISTOR UN2213			(E285B/E430B/E530B)
		< RESISTOR >			
R100	1-216-089-91	RES, CHIP	47K	5%	1/10W
R101	1-249-413-11	CARBON	470	5%	1/4W F
R103	1-249-437-11	CARBON	47K	5%	1/4W
R104	1-216-081-00	METAL CHIP	22K	5%	1/10W
R105	1-216-081-00	METAL CHIP	22K	5%	1/10W
R106	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R107	1-216-049-91	RES, CHIP	1K	5%	1/10W
R108	1-249-400-11	CARBON	39	5%	1/4W F
R109	1-249-400-11	CARBON	39	5%	1/4W F
R111	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R112	1-216-089-91	RES, CHIP	47K	5%	1/10W
R113	1-216-089-91	RES, CHIP	47K	5%	1/10W
R114	1-216-089-91	RES, CHIP	47K	5%	1/10W
R115	1-216-089-91	RES, CHIP	47K	5%	1/10W
R119	1-249-413-11	CARBON	470	5%	1/4W F
R120	1-216-097-91	RES, CHIP	100K	5%	1/10W
R122	1-249-413-11	CARBON	470	5%	1/4W F
R123	1-247-815-91	CARBON	220	5%	1/4W
R130	1-216-085-00	METAL CHIP	33K	5%	1/10W
R131	1-216-085-00	METAL CHIP	33K	5%	1/10W
R134	1-216-089-91	RES, CHIP	47K	5%	1/10W
R135	1-216-073-00	METAL CHIP	10K	5%	1/10W
R136	1-216-077-00	METAL CHIP	15K	5%	1/10W
R160	1-216-073-00	METAL CHIP	10K	5%	1/10W
R161	1-216-049-91	RES, CHIP	1K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R162	1-216-049-91	RES, CHIP	1K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R163	1-249-407-11	CARBON	150	5%	1/4W F
R164	1-249-413-11	CARBON	470	5%	1/4W F
R167	1-216-049-91	RES, CHIP	1K	5%	1/10W (E130/E180EE/E230/E285VC/E295/ E380EE/E480EE/E530UX)
R168	1-216-049-91	RES, CHIP	1K	5%	1/10W (E130/E180EE/E230/E285/E295/ E380EE/E430/E530)
R169	1-216-049-91	RES, CHIP	1K	5%	1/10W (E130/E177/E180/E230: AE, CP, VP1, VP2/ E285VC/E295: CP, VC1, VC2/E380EG/ E430: AE, CP, VC, VP/E477/E480/E530: CP, VC)
R170	1-216-121-91	RES, CHIP	1M	5%	1/10W
R171	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R172	1-249-429-11	CARBON	10K	5%	1/4W
R173	1-216-039-00	METAL CHIP	390	5%	1/10W
R174	1-218-179-11	RES, CHIP	10M	5%	1/10W
R175	1-216-113-00	METAL CHIP	470K	5%	1/10W
R176	1-216-041-00	METAL CHIP	470	5%	1/10W
R177	1-216-105-91	RES, CHIP	220K	5%	1/10W
R178	1-216-041-00	METAL CHIP	470	5%	1/10W
R179	1-216-041-00	METAL CHIP	470	5%	1/10W
R181	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R182	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R184	1-216-073-00	METAL CHIP	10K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R185	1-216-295-91	SHORT	0		(E130/E177/E180EG/E230UY/E285B/E430AE)
R185	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (E230:AE,EY/380EG/E430CP)
R185	1-216-061-00	METAL CHIP	3.3K	5%	1/10W (E230CP/E295UX/E430: B, VP/E480EG)
R185	1-216-067-00	METAL CHIP	5.6K	5%	1/10W (E230: VP1, VP2/E430VC/E477/E530B)
R185	1-216-071-00	METAL CHIP	8.2K	5%	1/10W (E285VC/E530: CP, UX)
R185	1-216-075-00	METAL CHIP	12K	5%	1/10W (E295CP/E530VC)
R185	1-216-085-00	METAL CHIP	33K	5%	1/10W (E295: VC1, VC2)
R186	1-216-049-91	RES, CHIP	1K	5%	1/10W
R187	1-216-295-91	SHORT	0		
R188	1-216-295-91	SHORT	0		
R189	1-249-417-11	CARBON	1K	5%	1/4W F
R190	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R191	1-216-089-91	RES, CHIP	47K	5%	1/10W
R192	1-216-089-91	RES, CHIP	47K	5%	1/10W
R194	1-216-295-91	SHORT	0		
R196	1-216-089-91	RES, CHIP	47K	5%	1/10W
R198	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R199	1-249-437-11	CARBON	47K	5%	1/4W
R201	1-216-041-00	METAL CHIP	470	5%	1/10W
R202	1-216-067-00	METAL CHIP	5.6K	5%	1/10W (E430/E477/E480/E530)
R202	1-216-065-91	RES, CHIP	4.7K	5%	1/10W (E130/E177/E180/E230/E285/E295/E380)
R203	1-249-413-11	CARBON	470	5%	1/4W F
R204	1-216-047-91	RES, CHIP	820	5%	1/10W
R205	1-216-037-00	METAL CHIP	330	5%	1/10W
R206	1-216-037-00	METAL CHIP	330	5%	1/10W
R207	1-216-073-00	METAL CHIP	10K	5%	1/10W
R208	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R209	1-216-041-00	METAL CHIP	470	5%	1/10W
R210	1-216-025-91	RES, CHIP	100	5%	1/10W
R218	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R219	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R221	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R222	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R223	1-216-017-91	RES, CHIP	47	5%	1/10W
R224	1-216-017-91	RES, CHIP	47	5%	1/10W (E295/E380EE/E430: AE, VP/E530)
R225	1-216-295-91	SHORT	0		
R226	1-216-025-91	RES, CHIP	100	5%	1/10W
R227	1-216-025-91	RES, CHIP	100	5%	1/10W
R228	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R229	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R230	1-216-045-00	METAL CHIP	680	5%	1/10W
R231	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R232	1-216-049-91	RES, CHIP	1K	5%	1/10W
R233	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R234	1-216-089-91	RES, CHIP	47K	5%	1/10W
R235	1-216-049-91	RES, CHIP	1K	5%	1/10W
R236	1-216-049-91	RES, CHIP	1K	5%	1/10W
R237	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R238	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R239	1-216-057-00	METAL CHIP	2.2K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R240	1-216-049-91	RES, CHIP	1K	5%	1/10W
R243	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R260	1-216-045-00	METAL CHIP	680	5%	1/10W
R261	1-216-045-00	METAL CHIP	680	5%	1/10W (E430/E477/E480/E530)
R262	1-216-295-91	SHORT	0		
R263	1-216-295-91	SHORT	0		
R264	1-216-295-91	SHORT	0		
R265	1-216-295-91	SHORT	0 (E430/E477/E480/E530)		
R266	1-216-055-00	METAL CHIP	1.8K	5%	1/10W (E430/E477/E480/E530)
R266	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (E230: EY, UY/E295)
R266	1-216-051-00	METAL CHIP	1.2K	5%	1/10W (E130/E177/E180/E230: AE, CP, VP1, VP2/ E285/E380)
R267	1-216-073-00	METAL CHIP	10K	5%	1/10W
R268	1-216-081-00	METAL CHIP	22K	5%	1/10W
R269	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R270	1-216-081-00	METAL CHIP	22K	5%	1/10W
R271	1-216-049-91	RES, CHIP	1K	5%	1/10W
R272	1-216-081-00	METAL CHIP	22K	5%	1/10W
R273	1-216-081-00	METAL CHIP	22K	5%	1/10W
R274	1-216-073-00	METAL CHIP	10K	5%	1/10W
R275	1-216-073-00	METAL CHIP	10K	5%	1/10W
R276	1-216-049-91	RES, CHIP	1K	5%	1/10W
R278	1-216-025-91	RES, CHIP	100	5%	1/10W (E130/E177/E180/E230/E285/E295/E380)
R301	1-216-093-00	METAL CHIP	68K	5%	1/10W
R302	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R303	1-216-093-00	METAL CHIP	68K	5%	1/10W
R304	1-216-093-00	METAL CHIP	68K	5%	1/10W (E295/E380EE/E430: AE, VP/E530)
R305	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R306	1-216-073-00	METAL CHIP	10K	5%	1/10W
R307	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R308	1-216-067-00	METAL CHIP	5.6K	5%	1/10W (E295/E380EE/E430: AE, VP/E530)
R309	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R310	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R311	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R312	1-216-079-00	METAL CHIP	18K	5%	1/10W
R313	1-216-109-00	METAL CHIP	330K	5%	1/10W
R314	1-216-035-00	METAL CHIP	270	5%	1/10W
R315	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R316	1-216-073-00	METAL CHIP	10K	5%	1/10W
R317	1-216-079-00	METAL CHIP	18K	5%	1/10W
R318	1-216-075-00	METAL CHIP	12K	5%	1/10W
R320	1-216-047-91	RES, CHIP	820	5%	1/10W
R321	1-249-401-11	CARBON	47	5%	1/4W F
R322	1-216-063-91	RES, CHIP	3.9K	5%	1/10W
R323	1-249-381-11	CARBON	1	5%	1/4W F
R324	1-216-031-00	METAL CHIP	180	5%	1/10W
R401	1-216-073-00	METAL CHIP	10K	5%	1/10W
R402	1-216-013-00	METAL CHIP	33	5%	1/10W
R403	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R404	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R405	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R406	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R407	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R408	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R412	1-216-073-00	METAL CHIP	10K	5%	1/10W
R413	1-216-013-00	METAL CHIP	33	5%	1/10W
R414	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R415	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R416	1-216-065-91	RES, CHIP	4.7K	5%	1/10W (EXCEPT E130/E230)
R417	1-216-081-00	METAL CHIP	22K	5%	1/10W (EXCEPT E130/E230)
R418	1-216-689-11	METAL CHIP	39K	0.5%	1/10W (EXCEPT E130/E230)
R422	1-249-417-11	CARBON	1K	5%	1/4W F
R423	1-249-417-11	CARBON	1K	5%	1/4W F
R424	1-249-417-11	CARBON	1K	5%	1/4W F
R425	1-216-085-00	METAL CHIP	33K	5%	1/10W
R426	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R500	1-216-041-00	METAL CHIP	470	5%	1/10W
R501	1-216-041-00	METAL CHIP	470	5%	1/10W
R502	1-216-041-00	METAL CHIP	470	5%	1/10W
R504	1-216-033-00	METAL CHIP	220	5%	1/10W
R505	1-216-049-91	RES, CHIP	1K	5%	1/10W
R510	1-249-408-11	CARBON	180	5%	1/4W F
R511	1-249-407-11	CARBON	150	5%	1/4W F
R512	1-216-021-00	METAL CHIP	68	5%	1/10W
R514	1-216-037-00	METAL CHIP	330	5%	1/10W
R515	1-216-049-91	RES, CHIP	1K	5%	1/10W (EXCEPT E180EE/E380EE/E480EE)
R516	1-216-065-91	RES, CHIP	4.7K	5%	1/10W (EXCEPT E180EE/E380EE/E480EE)
R517	1-216-022-00	METAL CHIP	75	5%	1/10W
R530	1-216-049-91	RES, CHIP	1K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R531	1-216-055-00	METAL CHIP	1.8K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R540	1-216-025-91	RES, CHIP	100	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R541	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R542	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R545	1-216-085-00	METAL CHIP	33K	5%	1/10W
R546	1-216-089-91	RES, CHIP	47K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R547	1-216-049-91	RES, CHIP	1K	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R548	1-216-022-00	METAL CHIP	75	5%	1/10W (E230CP/E285/E295/E430/E530)
R549	1-216-022-00	METAL CHIP	75	5%	1/10W (E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)
R570	1-216-041-00	METAL CHIP	470	5%	1/10W (E230CP/E285/E295/E430/E530)

Ref. No.	Part No.	Description			Remark
R571	1-216-041-00	METAL CHIP	470	5%	1/10W
		(E230CP/E285/E295/E430/E530)			
R572	1-216-041-00	METAL CHIP	470	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R574	1-216-097-91	RES, CHIP	100K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R580	1-216-073-00	METAL CHIP	10K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R581	1-216-077-00	METAL CHIP	15K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R582	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R583	1-216-097-91	RES, CHIP	100K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R584	1-216-097-91	RES, CHIP	100K	5%	1/10W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
R585	1-216-097-91	RES, CHIP	100K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R586	1-249-441-11	CARBON	100K	5%	1/4W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
R587	1-249-441-11	CARBON	100K	5%	1/4W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
R588	1-216-073-00	METAL CHIP	10K	5%	1/10W
		(E230CP/E285/E295/E430: B, CP, VC/E530)			
R589	1-216-073-00	METAL CHIP	10K	5%	1/10W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
R590	1-216-073-00	METAL CHIP	10K	5%	1/10W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
R600	1-249-417-11	CARBON	1K	5%	1/4W F
R601	1-216-452-11	METAL OXIDE	180	5%	2W F
R602	1-249-417-11	CARBON	1K	5%	1/4W F
R603	1-216-089-91	RES, CHIP	47K	5%	1/10W
		(EXCEPT E180EE/E380EE/E480EE)			
R604	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
		(EXCEPT E180EE/E380EE/E480EE)			
R605	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R606	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R607	1-216-089-91	RES, CHIP	47K	5%	1/10W
R608	1-249-414-11	CARBON	560	5%	1/4W F
R609	1-247-815-91	CARBON	220	5%	1/4W
R610	1-247-815-91	CARBON	220	5%	1/4W
R611	1-215-908-00	METAL OXIDE	33	5%	3W F
R612	1-215-857-11	METAL OXIDE	10	5%	1W F
R613	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R614	1-216-065-91	RES, CHIP	4.7K	5%	1/10W
R660	1-216-049-91	RES, CHIP	1K	5%	1/10W
R661	1-216-295-91	SHORT	0		
R662	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R663	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R664	1-216-049-91	RES, CHIP	1K	5%	1/10W
		(E130/E177/E180/E230: AE, EY, UY, VP1, VP2/ E295UX/E380/E430: AE, VP/E477/E480/E530UX)			
R664	1-216-041-00	METAL CHIP	470	5%	1/10W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			

Ref. No.	Part No.	Description			Remark
R665	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R666	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R669	1-216-049-91	RES, CHIP	1K	5%	1/10W
		(E177/E180/E285B/E380/ E430B/E477/E480/E530B)			
R670	1-216-041-00	METAL CHIP	470	5%	1/10W
R671	1-216-041-00	METAL CHIP	470	5%	1/10W
R672	1-216-089-91	RES, CHIP	47K	5%	1/10W
R673	1-216-089-91	RES, CHIP	47K	5%	1/10W
R674	1-216-081-00	METAL CHIP	22K	5%	1/10W
R675	1-216-113-00	METAL CHIP	470K	5%	1/10W
R677	1-216-295-91	SHORT	0		
		(E130/E177/E180/E230: AE, EY, UY, VP1, VP2/ E295UX/E380/E430: AE, VP/E477/E480/E530UX)			
R677	1-216-041-00	METAL CHIP	470	5%	1/10W
		(E230CP/E285/E295: CP, VC1, VC2/ E430: B, CP, VC/E530B, CP, VC)			
R702	1-216-295-91	SHORT	0		
R711	1-212-893-00	FUSIBLE	330	5%	1/4W F
R713	1-216-025-91	RES, CHIP	100	5%	1/10W
R714	1-216-113-00	METAL CHIP	470K	5%	1/10W
R715	1-216-049-91	RES, CHIP	1K	5%	1/10W
R716	1-216-049-91	RES, CHIP	1K	5%	1/10W
R717	1-216-037-00	METAL CHIP	330	5%	1/10W
R731	1-216-041-00	METAL CHIP	470	5%	1/10W
		(E285B/E430B/E530B)			
R733	1-216-041-00	METAL CHIP	470	5%	1/10W
		(E177/E180/E285B/E380/ E430B/E477/E480/E530B)			
R750	1-249-417-11	CARBON	1K	5%	1/4W F
R752	1-216-049-91	RES, CHIP	1K	5%	1/10W
R753	1-216-081-00	METAL CHIP	22K	5%	1/10W
R754	1-216-025-91	RES, CHIP	100	5%	1/10W
R755	1-216-025-91	RES, CHIP	100	5%	1/10W
R756	1-216-073-00	METAL CHIP	10K	5%	1/10W
		(EXCEPT E180EE/E380EE/E480EE)			
R757	1-216-049-91	RES, CHIP	1K	5%	1/10W
		(EXCEPT E180EE/E380EE/E480EE)			
R850	1-247-807-31	CARBON	100	5%	1/4W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
R851	1-216-079-00	METAL CHIP	18K	5%	1/10W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
R852	1-216-083-00	METAL CHIP	27K	5%	1/10W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
R853	1-216-049-91	RES, CHIP	1K	5%	1/10W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
R856	1-216-097-91	RES, CHIP	100K	5%	1/10W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
R857	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			
R858	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
		(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)			

Ref. No.	Part No.	Description	Remark
R859	1-216-123-11	METAL CHIP 1.2M 5% 1/10W	(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)
R860	1-216-123-11	METAL CHIP 1.2M 5% 1/10W	(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)
R861	1-216-117-00	METAL CHIP 680K 5% 1/10W	(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)
R862	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	(E230: VP1, VP2/E285/E295: UX, VC1, VC2/ E430: B, VC, VP/E530: B, UX, VC)
R968	1-247-883-91	METAL CHIP 150K 5% 1/10W	(E285B/E430B/E530B)
R969	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	(E285B/E430B/E530B)
R970	1-216-085-00	METAL CHIP 33K 5% 1/10W	(E285B/E430B/E530B)
R971	1-216-085-00	METAL CHIP 33K 5% 1/10W	(E285B/E430B/E530B)
R973	1-216-081-00	METAL CHIP 22K 5% 1/10W	(E285B/E430B/E530B)
R974	1-216-081-00	METAL CHIP 22K 5% 1/10W	(E285B/E430B/E530B)
R975	1-216-295-91	SHORT 0 (E285B/E430B/E530B)	
R976	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	(E285B/E430B/E530B)
R977	1-216-089-91	RES, CHIP 47K 5% 1/10W	(E285B/E430B/E530B)
R978	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	(E285B/E430B/E530B)
R979	1-216-073-00	METAL CHIP 10K 5% 1/10W	(E285B/E430B/E530B)
R980	1-216-097-91	RES, CHIP 100K 5% 1/10W	(E285B/E430B/E530B)
R981	1-216-083-00	METAL CHIP 27K 5% 1/10W	(E285B/E430B/E530B)
R982	1-216-089-91	RES, CHIP 47K 5% 1/10W	(E285B/E430B/E530B)
R983	1-216-065-91	RES, CHIP 4.7K 5% 1/10W	(E285B/E430B/E530B)
R985	1-216-041-00	METAL CHIP 470 5% 1/10W	(E285B/E430B/E530B)
R986	1-216-089-91	RES, CHIP 47K 5% 1/10W	(E285B/E430B/E530B)
R988	1-216-083-00	METAL CHIP 27K 5% 1/10W	(E285B/E430B/E530B)
R989	1-216-049-91	RES, CHIP 1K 5% 1/10W	(E285B/E430B/E530B)
R990	1-216-295-91	SHORT 0 (E285B/E430B/E530B)	
R993	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	(E285B/E430B/E530B)
R994	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	(E285B/E430B/E530B)
R995	1-216-073-00	METAL CHIP 10K 5% 1/10W	(E285B/E430B/E530B)
R996	1-216-689-11	METAL CHIP 39K 0.5% 1/10W	(E285B/E430B/E530B)
R997	1-216-073-00	METAL CHIP 10K 5% 1/10W	(E285B/E430B/E530B)
R998	1-216-073-00	METAL CHIP 10K 5% 1/10W	(E285B/E430B/E530B)
R999	1-216-295-91	SHORT 0 (E285B/E430B/E530B)	
		< SWITCH >	
S100	1-771-155-11	SWITCH, ROTARY (CAM ENCODER)	
S101	1-762-108-11	SWITCH, PUSH (1 KEY) (REC PRF)	
S160	1-571-588-31	SWITCH, SLIDE (NTSC PB) (EXCEPT E130/E230)	
S401	1-571-532-32	SWITCH, TACTIL (ON/STANDBY)	
S402	1-571-532-32	SWITCH, TACTIL (EJECT)	
S403	1-571-532-32	SWITCH, TACTIL (REC)	
S404	1-571-532-32	SWITCH, TACTIL (PAUSE)	
S405	1-571-532-32	SWITCH, TACTIL (PROGRAM+)	
S406	1-571-532-32	SWITCH, TACTIL (PROGRAM–)	
S407	1-571-532-32	SWITCH, TACTIL (RF CHANNEL)	
		< TRANSFORMER >	
T321	1-431-097-11	TRANSFORMER, BIAS OSCILLATION	
		< TUNER >	
TU700	1-693-404-11	TUNER, MOD/IF (BTF-3MC403)	(E130/E230: AE, CP, VP1, VP2/ E285VC/E295: CP, VC1, VC2/ E430: AE, CP, VC, VP/E530: CP, VC)
TU700	1-693-403-11	TUNER, MOD/IF (BTF-3MC444)	(E285B/E430B/E530B)
TU700	1-693-360-12	TUNER, MOD/IF SOLID TYPE	(E177/E180EG/E380EG/E477/E480EG)
TU700	1-693-359-12	TUNER, MOD/IF SOLID TYPE	(E180EE/E380EE/E480EE)
TU700	1-693-402-11	TUNER, MOD/IF (BTF-3MU603)	(E230UY/E295UX/E530UX)
TU700	1-693-401-11	TUNER, MOD/IF (BTF-3MC433) (230EY)	
		< VIBRATOR >	
X161	1-760-494-11	VIBRATOR, CRYSTAL (16MHz)	
X162	1-579-463-11	VIBRATOR, CRYSTAL (32.768kHz)	
X201	1-579-608-11	VIBRATOR, CRYSTAL (4.43MHz)	
X660	1-577-289-11	VIBRATOR, CRYSTAL (17.734475MHz)	
		MISCELLANEOUS	
		**********	
6	1-762-844-21	SWITCH, ROTARY (E380/E530)	
⚠55	1-777-854-21	CORD, POWER	
704	1-500-144-11	HEAD, FE	
769	1-759-183-11	DRUM ASSY, DZH-78A-R	(E130/E177/E180/E230: AE, CP, VP2/ E285: B/E380)
769	1-759-522-11	DRUM ASSY, DZH-93A-R	(E430/E477/E480/E530)
769	1-759-523-11	DRUM ASSY, DZH-92A-R	(E230: EY, UY, VP1/E285: VC/E295)
M902	1-698-971-11	MOTOR, DC (CAPSTAN)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
M903	X-3947-577-1	MOTOR ASSY, CAM	
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-648-79	SCREW +BVTP 3X12 TYPE2	
#2	7-682-547-04	SCREW +P 3X6	
#3	7-685-646-79	SCREW (3X8)	
#4	7-685-133-19	SCREW (DIA. 2.6) (IT3B)	
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-475-565-11	COMMANDER, STANDARD (RMT-V220)	(E130/E177/E180/E380: EE)
	1-475-565-31	COMMANDER, STANDARD (RMT-V220B)	(E480: EE)
	1-475-566-11	COMMANDER, STANDARD (RMT-V221)	(E230: AE, CP, VP1, VP2/E285: VC/E380: EG)
	1-475-566-21	COMMANDER, STANDARD (RMT-V221A)	(E230: EY, UY)
	1-475-566-31	COMMANDER, STANDARD (RMT-V221B)	(E285: B)
	1-475-566-41	COMMANDER, STANDARD (RMT-V221C)	(E430: B)
	1-475-566-51	COMMANDER, STANDARD (RMT-V221D)	(E477)
	1-475-566-61	COMMANDER, STANDARD (RMT-V221E)	(E430: AE, CP, VC, VP/E480: EG)
	1-475-567-11	COMMANDER, STANDARD (RMT-V222)	(E295: CP, VC1, VC2/E530: CP, VC)
	1-475-567-21	COMMANDER, STANDARD (RMT-V222A)	(E295: UX/E530: UX)
	1-475-567-31	COMMANDER, STANDARD (RMT-V222B)	(E530: B)
	1-696-593-11	CORD, CONNECTION (PAL) (ANT) 1.5m	
⚠	1-770-019-11	ADAPTOR, CONVERSION PLUG 3P	(E230: EY, UY/E295: UX/E530: UX)
	3-709-128-01	COVER, BATTERY (for EXCEPT RMT-V220 /V220B) (E230/E285/E295/E380: EG/E430 /E477/E480: EG/E530)	
	3-709-322-01	COVER, BATTERY (for RMT-V220/V220B)	(E130/E177/E180/E380: EE/E480: EE)
	3-861-449-11	MANUAL, INSTRUCTION (ENGLISH)	(E295: UX/E530: UX)
	3-861-449-21	MANUAL, INSTRUCTION (FRENCH)	(E295: VC1/E530: VC)
	3-861-449-32	MANUAL, INSTRUCTION (FRENCH) (E530: B)	
	3-861-449-41	MANUAL, INSTRUCTION (SPANISH)	(E295: CP/E530: CP)
	3-861-449-51	MANUAL, INSTRUCTION (GERMAN)	(E295: VC1/E530: VC)
	3-861-449-61	MANUAL, INSTRUCTION (ITALIAN)	(E295: CP, VC1/E530: CP, VC)
	3-861-449-71	MANUAL, INSTRUCTION (DUTCH)	(E295: VC1/E530: VC)
	3-861-449-81	MANUAL, INSTRUCTION (PORTUGUESE)	(E295: VC2)
	3-861-451-11	MANUAL, INSTRUCTION (SWEDISH)	(E295: VC2)
	3-861-451-21	MANUAL, INSTRUCTION (DANISH) (E295: VC2)	
	3-861-451-31	MANUAL, INSTRUCTION (FINNISH) (E295: VC2)	
	3-861-451-41	MANUAL, INSTRUCTION (GREEK)	(E295: CP/E530: CP)
	3-861-452-11	MANUAL, INSTRUCTION (ENGLISH)	(E230: EY, UY)
	3-861-452-21	MANUAL, INSTRUCTION (FRENCH)	(E230: VP1/E285: VC/E430: VP)
	3-861-452-32	MANUAL, INSTRUCTION (FRENCH)	(E285: B/E430: B)
	3-861-452-41	MANUAL, INSTRUCTION (SPANISH)	(E230: CP/E430: CP)
	3-861-452-51	MANUAL, INSTRUCTION (GERMAN)	(E230: VP1/E285: VC/E430: VC, VP)
	3-861-452-61	MANUAL, INSTRUCTION (ITALIAN)	(E230: VP1/E285: VC/E430: AE, VP)
	3-861-452-71	MANUAL, INSTRUCTION (DUTCH)	(E230: VP1/E285: VC/E430: VP)
	3-861-452-82	MANUAL, INSTRUCTION (PORTUGUESE)	(E430: VC)
	3-861-453-11	MANUAL, INSTRUCTION (SWEDISH)	(E230: VP2)
	3-861-453-21	MANUAL, INSTRUCTION (DANISH) (E230: VP2)	
	3-861-453-31	MANUAL, INSTRUCTION (FINNISH) (E230: VP2)	
	3-861-453-42	MANUAL, INSTRUCTION (GREEK) (E430: AE)	
	3-861-454-11	MANUAL, INSTRUCTION (SWEDISH)	(E130: AE2)
	3-861-454-21	MANUAL, INSTRUCTION (DANISH) (E130: AE2)	
	3-861-454-31	MANUAL, INSTRUCTION (FINNISH) (E130: AE2)	
	3-861-454-41	MANUAL, INSTRUCTION (GREEK) (E130: AE1)	
	3-861-455-12	MANUAL, INSTRUCTION (ENGLISH)	(E380: EG/E477/E480: EG)
	3-861-455-22	MANUAL, INSTRUCTION (CZECH)	(E380: EG/E477/E480: EG)
	3-861-455-32	MANUAL, INSTRUCTION (POLISH)	(E380: EG/E477/E480: EG)
	3-861-455-42	MANUAL, INSTRUCTION (HUNGARIAN)	(E380: EG/E477/E480: EG)
	3-861-456-12	MANUAL, INSTRUCTION (ENGLISH)	(E177/E180: EG)
	3-861-456-22	MANUAL, INSTRUCTION (CZECH)	(E177/E180: EG)
	3-861-456-32	MANUAL, INSTRUCTION (POLISH)	(E177/E180: EG)
	3-861-456-42	MANUAL, INSTRUCTION (HUNGARIAN)	(E177/E180: EG)
	3-861-457-12	MANUAL, INSTRUCTION (ENGLISH)	(E180: EE/E380: EE/E480: EE)
	3-861-457-22	MANUAL, INSTRUCTION (RUSSIAN)	(E180: EE/E380: EE/E480: EE)
	3-861-462-11	MANUAL, INSTRUCTION (FRENCH) (E130: AE1)	
	3-861-462-21	MANUAL, INSTRUCTION (SPANISH)	(E130: AE2)
	3-861-462-31	MANUAL, INSTRUCTION (GERMAN)	(E130: AE1)
	3-861-462-41	MANUAL, INSTRUCTION (ITALIAN) (E130: AE1)	
	3-861-462-51	MANUAL, INSTRUCTION (DUTCH) (E130: AE1)	
	3-861-462-61	MANUAL, INSTRUCTION (PORTUGUESE)	(E130: AE2)
*	3-979-509-01	INDIVIDUAL CARTON (E530: CP, VC)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
*	3-979-509-11	INDIVIDUAL CARTON (E530: UX)	
*	3-979-509-21	INDIVIDUAL CARTON (E530: B)	
*	3-979-509-31	INDIVIDUAL CARTON (E430: AE, CP, VC, VP)	
*	3-979-509-41	INDIVIDUAL CARTON (E430: B)	
*	3-979-509-51	INDIVIDUAL CARTON (E295: UX)	
*	3-979-509-61	INDIVIDUAL CARTON (E295: CP, VC1, VC2)	
*	3-979-510-01	CUSHION	
*	3-979-511-01	SPACER	
*	3-987-571-11	INDIVIDUAL CARTON (E230: EY, UY)	
*	3-987-571-21	INDIVIDUAL CARTON (E130)	
*	3-987-571-31	INDIVIDUAL CARTON (E285: VC)	
*	3-987-571-41	INDIVIDUAL CARTON (E285: B)	
*	3-987-572-01	INDIVIDUAL CARTON (E480: EG)	
*	3-987-572-11	INDIVIDUAL CARTON (E480: EE)	
*	3-987-572-21	INDIVIDUAL CARTON (E477)	
*	3-987-572-31	INDIVIDUAL CARTON (E380: EG)	
*	3-987-572-41	INDIVIDUAL CARTON (E380: EE)	
*	3-987-572-51	INDIVIDUAL CARTON (E180: EG)	
*	3-987-572-61	INDIVIDUAL CARTON (E180: EE)	
*	3-987-572-71	INDIVIDUAL CARTON (E177)	

9-921-675-11

Sony Corporation
Home A&V Products Company

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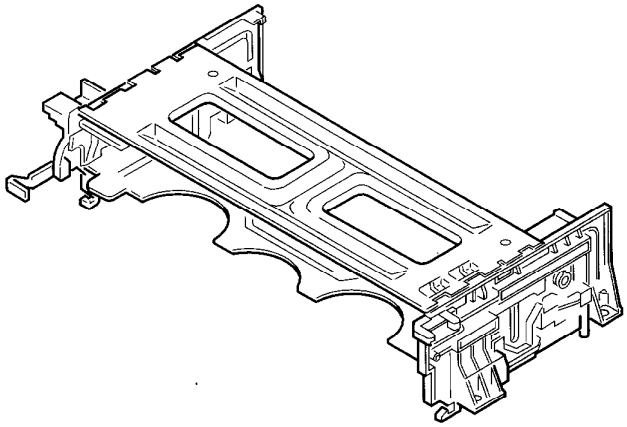
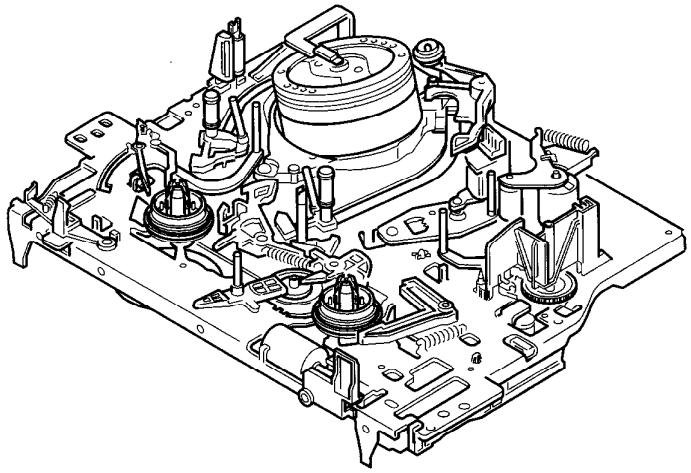
VHS MECHANICAL ADJUSTMENT MANUAL VI

S MECHANISM

VHS

Please use with the service manual.





VHS TAPE TRANSPORT MECHANISM DECK

MICROFILM

SONY®

ADJUSTMENTS REQUIRED THE FOLLOWING PARTS REPLACEMENT

PARTS / ADJUSTMENTS		4-1-1 TENSION REGULATOR POSITION/TENSION ADJUSTMENT	4-1-2 CHECKING THE TENSION AND TORQUE	4-1-3 X-VALUE ADJUSTMENT	4-1-4 HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6	4-1-5 ACE HEAD HEIGHT AND AZIMUTH ADJUSTMENT	4-1-6 X-VALUE FINE ADJUSTMENT	4-1-7 HEIGHT ADJUSTMENT OF GUIDE ROLLER NO. 8	4-1-8 CHECKING THE LINEARITY AND FLUCTUATION OF THE RF OUTPUT
3-25	REEL (S) TABLE	O	△	×	△	×	×	×	×
3-25	TG1 ASSEMBLY	O	×	×	△	×	×	×	×
3-6	FEH ASSEMBLY	×	×	×	△	×	×	×	×
3-23	DRUM BASE	×	×	O	O	O	O	O	O
3-2	DRUM ASSEMBLY	×	×	O	O	O	O	O	O
3-24	SHUTTLE (S) AND SHUTTLE (T) BLOCK ASSEMBLIES	×	×	O	O	O	O	O	×
3-5	ACE HEAD BLOCK	×	×	O	△	O	O	△	×
3-4	CAPSTAN MOTOR	×	×	×	△	O	O	O	×
3-3	PINCHI PRESS BLOCK ASS'Y	×	×	×	×	O	O	O	×
3-3	TG8 ASSEMBLY	×	×	×	×	×	×	O	×
3-10	REEL (T) TABLE	×	×	×	×	×	×	△	×
3-19	PULLEY GEAR ASSEMBLY	×	O	×	×	×	×	×	×
3-11	PENDULUM ARM ASSEMBLY	×	O	×	×	×	×	×	×

O: ADJUST
△: CHECK
×: NOT REQUIRED

1. PREPARATION FOR MECHANISM CHECKS, ADJUSTMENTS AND REPLACEMENT

For removal of the cabinet, printed wiring boards and others, please refer to the service manual "DISASSEMBLY".

1-1. LOADING AND THREADING PROCEDURE WHEN THE POWER TURNS OFF

1-1-1. LOADING AND THREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow Ⓐ direction until loading and threading are end.

1-1-2. LOADING AND THREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Applying approx. +9V (300mA) to cam motor with regulated DC power supply makes it loading and threading.

Note : When loading and threading without cassette, claws are caught in four positions as following figure (in the order ①-②-③-④).
So release them with hands.

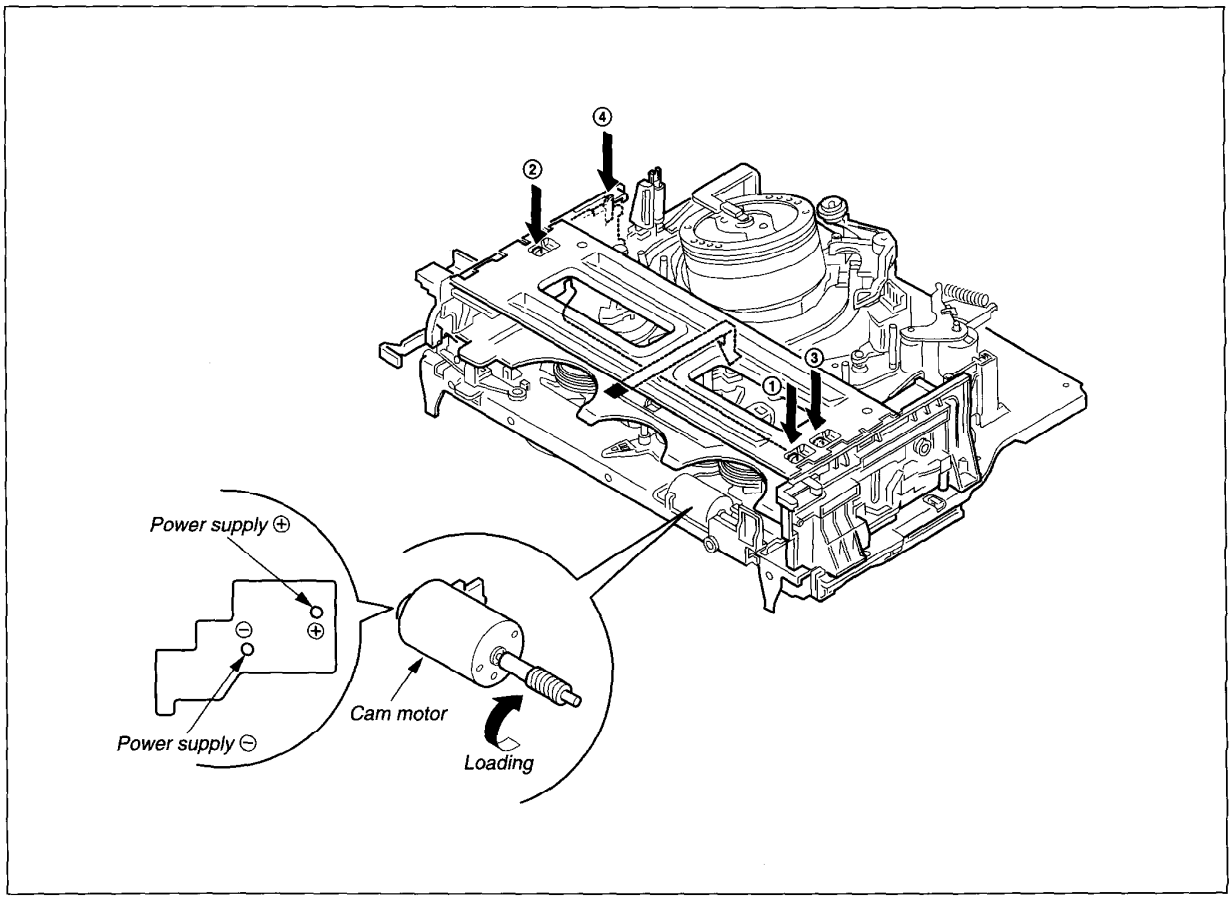


Fig. 1-1

1-2. UNLOADING AND UNTHREADING PROCEDURE WHEN THE POWER TURNS OFF

1-2-1. UNLOADING AND UNTHREADING PROCEDURE WITH HANDS

1) Turn cam motor in the arrow Ⓑ direction until unthreading is end.
2) Turn capstan motor in the arrow Ⓒ direction to take up tape in cassette.
3) Turn cam motor in the arrow Ⓑ direction until unloading is end.

1-2-2. UNLOADING AND UNTHREADING PROCEDURE WITH REGULATED DC POWER SUPPLY

1) Apply approx. +5V (300mA) to contrary polarities of cam motor.
2) Unthreading operation begins, tape guides return to their initial positions (Unthreading operation is end but tape remains), then stop cam motor by turning power off.

Note : When unloading begins and cassette lid is closed, turn cam motor in the arrow Ⓐ direction to open tape guard.

3) Turn capstan motor in the arrow Ⓒ direction to take up tape in cassette.

Note : Take care that tape is not caught at pinch roller.

4) Check that tape is no loosened completely, and apply approx. +5V (300mA) to contrary polarities of cam motor with regulated DC power supply.

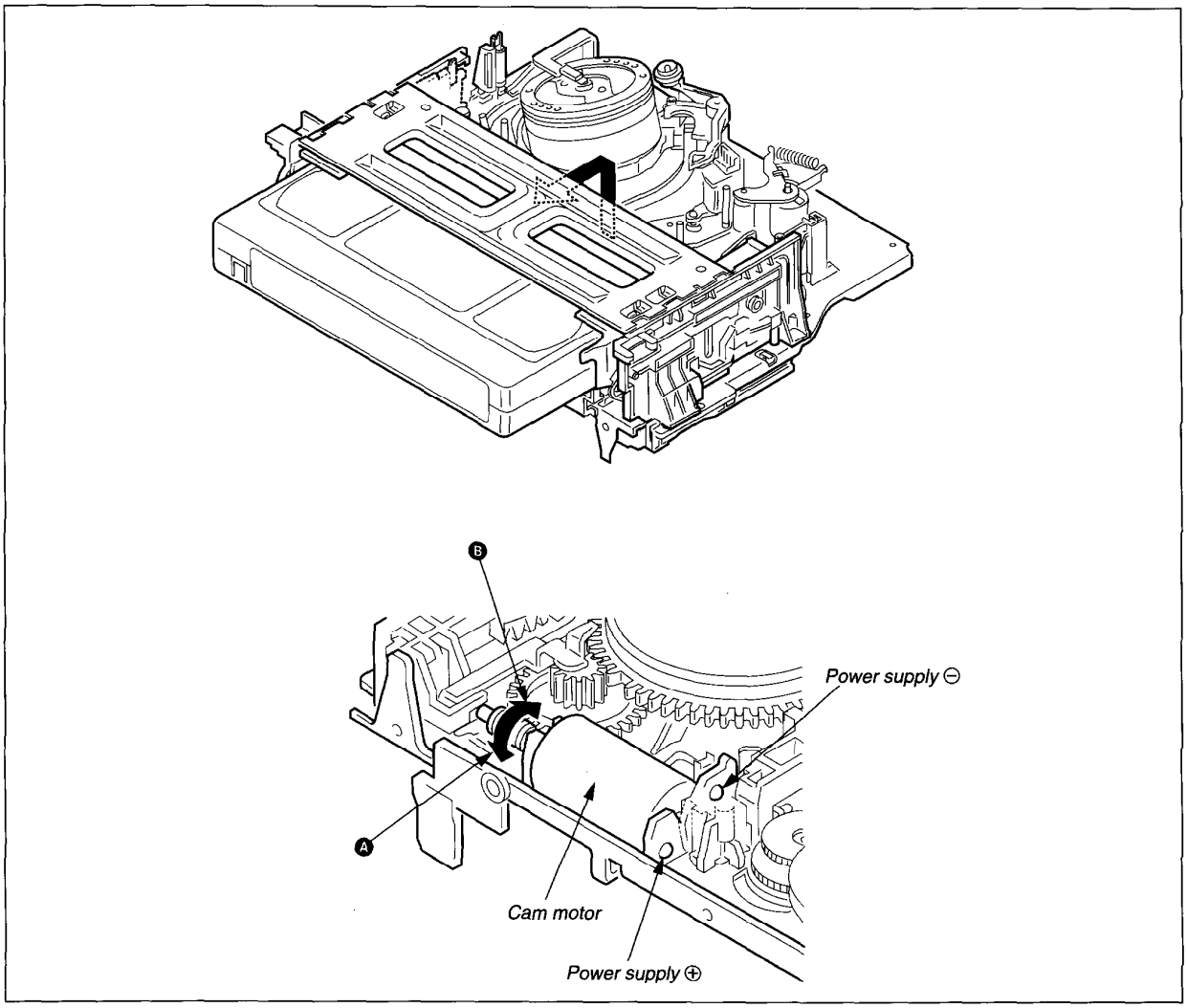


Fig. 1-2

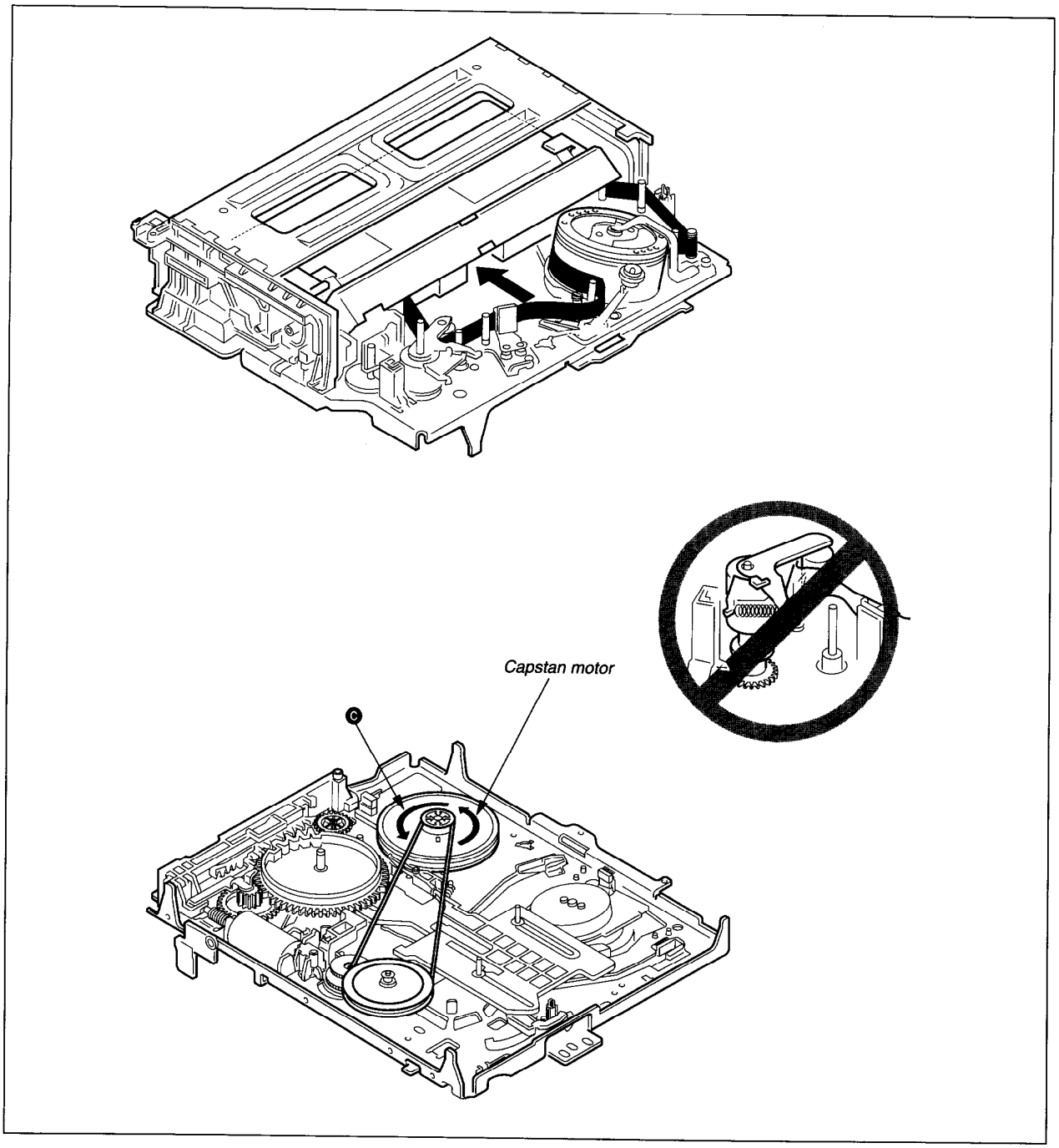


Fig. 1-3

1-3. HOW TO COMPLETE THREADING WITHOUT CASSETTE COMPARTMENT

Note 1 : Put the FL block assembly removed the FL top plate on the bottom not to put dust or grease the top sensor and the end sensor luminous plates or not to scratch them.

1) Pull out AC plug from wall outlet.
2) Shade near the end and top sensors with a black masking tape or the like.
3) Connect AC plug to wall outlet.

Note 2 : In this condition, some modes can not be set.
To make loading in this condition, set the video cassette tape without REC proof claw, pull the REC proof lever once and release it.
On loading without video cassette tape, it is necessary to deceive the microcomputer by turning the reel (T) table with hand.
Fast forward and rewind are not available.

Note 3 : After above mentioned operation, be sure to return the mode in the following order.

4) Pull out AC plug from wall outlet to reset the system control microcomputer.
5) Remove the tape near the end and top sensors.

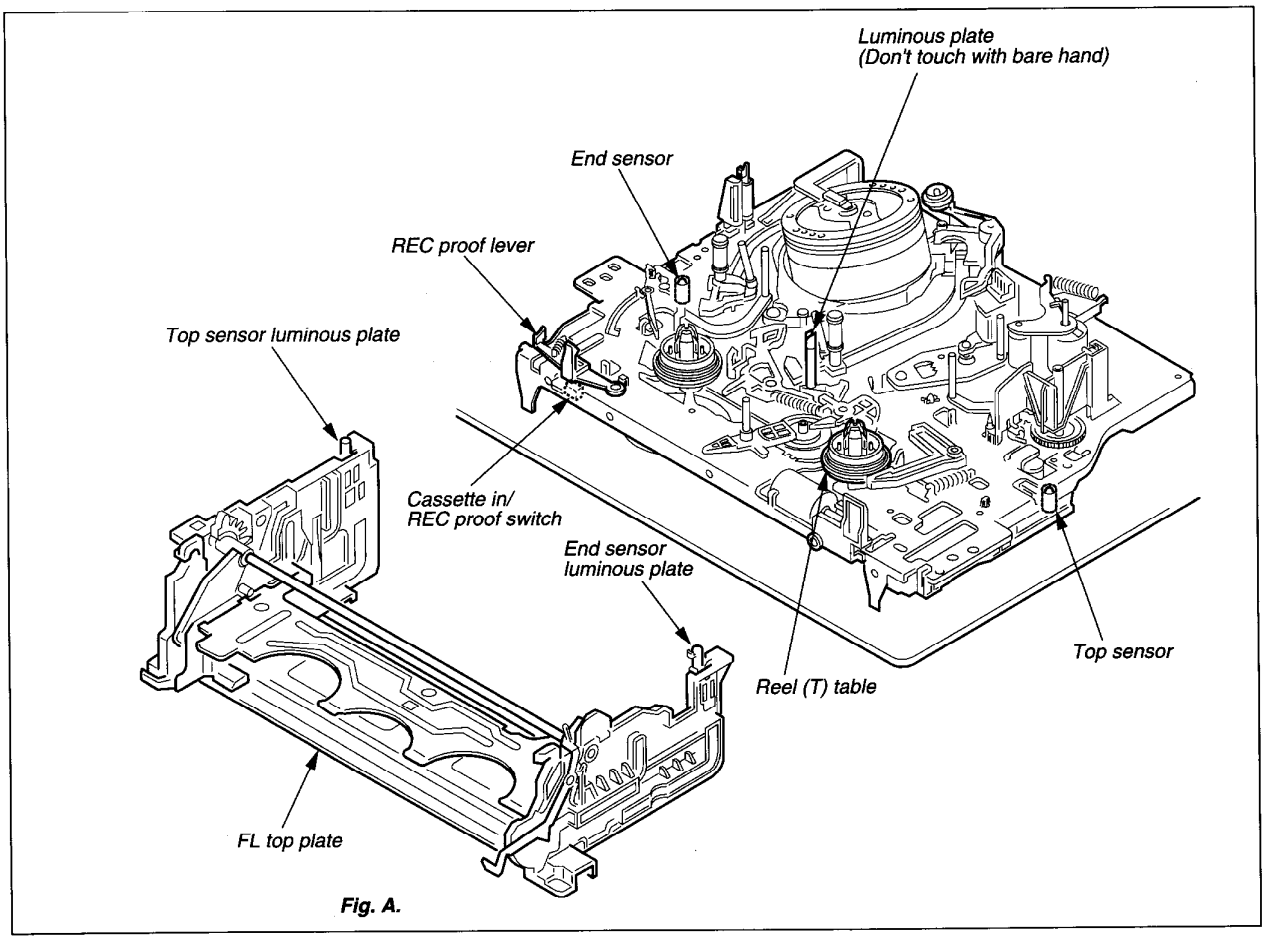


Fig. 1-4

2. PERIODIC CHECK AND REPLACEMENT

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes, it is recommended that the following periodic checks and maintenance be performed.

* The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1. CLEANING OF ROTATING HEAD DISK ASSEMBLY

1) Press a chamois cloth (Jig Ref. No. J-4) which has been dipped in cleaning fluid (Jig Ref. No. J-3) lightly against the rotating drum assembly, then do the cleaning by slowly rotating the rotating head disk by the hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a vertical angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-2. CLEANING OF THE TAPE MOVEMENT SYSTEM

1) Clean the surfaces which the tape contacts during its movement (tape guide, drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in cleaning fluid.

2-3. CLEANING THE DRIVE SYSTEM

1) Clean the driving parts with a cloth that has been dipped in cleaning fluid.

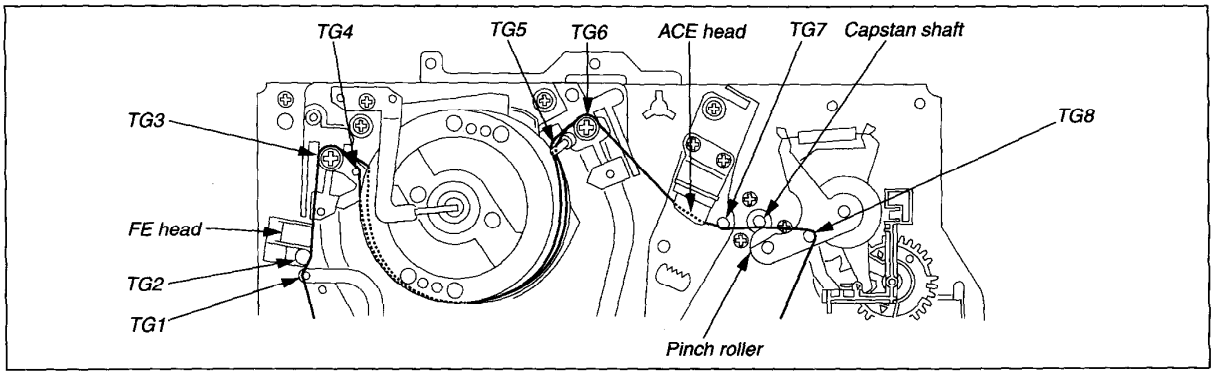


Fig. 2-1 Parts requiring cleaning

2-4. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to users' operating hours.

Maintenance & Check \ Operating Hours (H)		500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Transportation System	Cleaning of tape transportation system	O	O	O	O	O	O	O	O	O	O	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE assembly	O	O	O	O	O	O	O	O	O	O	
	Cleaning and degaussing of upper drum assembly	O	O	O	O	O	O	O	O	O	O	The life of the head varies, depending on operational conditions and method.
Performance Confirmation	Abnormal sound	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to 4-1-1. Specified value : Adjust to 5.0504 to 6.5214mN•m (51.5 to 66.5g•cm) (without TC assembly*) or 3.7755 to 5.0994mN•m (38.5 to 52.0g•cm)(with TC assembly*)
	Confirmation of brake system	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to section.
	Confirmation of record and playback functions	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.
	Measurement of forward torque	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 4.9033 to 8.8259mN•m (50 to 90 g•cm)

Note : On overhaul
When overhauling the unit, replace parts as indicated in the above table.

O : Cleaning ☆ : Confirmation

2-5. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref. No.	Name		Part No.	Caved Jig No.	Remarks
J-1	Torque Measurement Cassette VHT-103S		J-6090-072-A		For FWD & back tension torque measurement.
	Torque Measurement Cassette VHT-404S		J-6082-012-A		For CUE and REVIEW torque measurement.
J-2	Alignment Tape	KRV-52NE* (NTSC)	8-192-605-41		Tape path, Audio azimuth, X-value adjustments
		KRV-51N2 (NTSC)	8-192-605-32		Electrical adjustments, Operation checks
		KRV-52PL (PAL)	8-192-605-46		Tape path, Audio azimuth, X-value adjustments
		KRV-51P (PAL)	8-192-605-36		Electrical adjustments, Operation checks
J-3	Cleaning fluid		Y-2031-001-0	—	
J-4	Chamois Leather		2-034-697-00	—	
J-5	Dental Mirror (With Handle) Dental Mirror (Mirror)		J-6080-029-A J-6080-030-1	SL-5052	Tape path and tape traveling adjustments or checks.
J-6	FLOIL SG-646		7-651-000-44		Net. 20g
J-7	Diamond Oil NT-68		7-661-018-18		
J-8	Screw Lock G (1401B)		7-432-114-11		
J-9	X-value adjusting driver		J-6090-073-A		X-value adjustment
J-10	Mode Selector II		J-6082-282-A	—	For S mechanism stand-alone operation
J-11	Connector Conversion Jig		J-6090-052-A	—	For S mechanism stand-alone operation
J-12	S Type Capstan Board		J-6090-075-A	—	For S mechanism stand-alone operation

* Be sure to use KRV-52NE having version number.

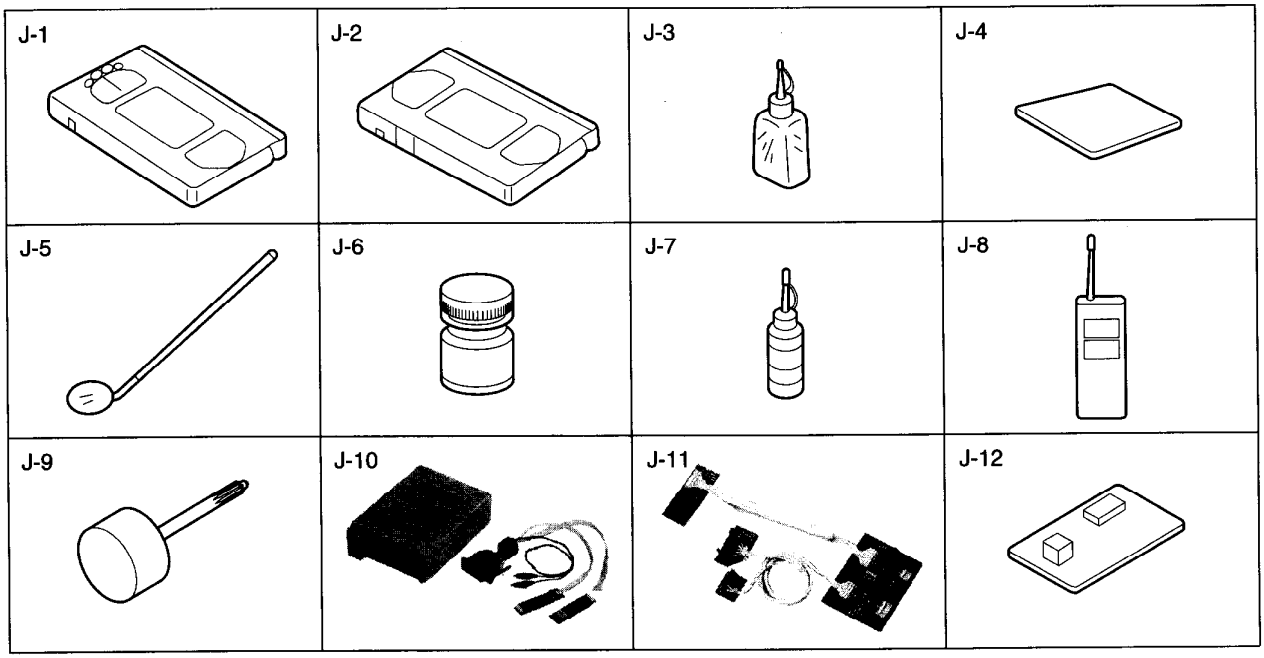


Fig. 2-2

2-6. HOW TO USE THE MODE SELECTOR II FOR ADJUSTING S TYPE MECHANISM ASSEMBLY

2-6-1. OUTLINE

To activate the VHS system S type mechanism assembly using mode selector II (J-6082-282-A), use connector conversion jig (J-6090-052-A) and the S type capstan board (J-6090-075-A). By using the connector conversion jig and the S type capstan board, the following operations are possible.

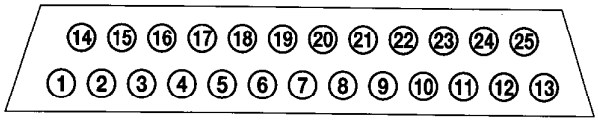
- Loading and unloading action by the loading motor.
- Normal and reverse rotation of the capstan motor.

2-6-2. PREPARATION

1) In order to drive the capstan motor, the power +5V and +12V are supplied from the Mode Selector II. Disassemble the D-SUB connector of the Mode Selector cable, then solder the following three places.

Supplied 3-pin cable	D-SUB connector of the Mode Selector II	Voltage
Pin 1 (Red index)	Pin 20	+12V
Pin 2	Pin 25	GND
Pin 3	Pin 24	+5V

- Connector pin number assignment of the D-SUB connector (From the soldering side)



- When connections are made, check that +5V and +12V are available at the 3-pin cable connector.

2) CHECKING THE SOFTWARE VERSION
Turn on the power of the Mode Selector II.
If the reading of the software version on the Mode Selector II is not 1.10 or higher, replace the new ROM (J-6082-314-A).

2-6-3. CONNECTION

1) S TYPE CAPSTAN BOARD ATTACHMENT
Replace the capstan board supplied with the connector conversion jig (J-6090-052-A) with the S type capstan board (J-6090-075-A).
2) CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE MODE SELECTOR II.
Insert the connectors of the two 6-pin cables (one is white and the other is black) and the 3-pin cable from the Mode Selector II to the corresponding connectors on the connector conversion jig (J-6090-052-A).
3) CONNECTION BETWEEN THE CONNECTOR CONVERSION JIG AND THE S TYPE MECHANISM ASSEMBLY
With the power of the Mode Selector II turned off, insert the following two connectors to the corresponding connectors on the S type mechanism assembly.
   - 3-pin connector for the loading motor
   - 10-pin connector for the capstan motor

Set the speed control for the minimum setting (fully counterclockwise).

2-6-4. OPERATION

1) OPERATION OF THE LOADING MOTOR ON THE S TYPE MECHANISM ASSEMBLY
   ① Select the H type mechanism assembly setting on the Mode Selector II.
   ② Operating procedures after the mechanism selection
   For the operating procedures, see pages 3 to 5 of "8mm Video Mechanical Adjustment Manual IV (TK Mechanism) Supplement-1".
   For the loading procedure, see page 4 of "VHS Mechanical Adjustment manual IV (S Mechanism)".
2) OPERATION OF THE CAPSTAN MOTOR ON THE S TYPE MECHANISM ASSEMBLY
   ① By the loading motor operation under the item 1), change the mode setting to the FF/REW mode.
   ② Turn the speed control gradually in clockwise direction, then the capstan motor starts rotating. To turn the capstan motor in desired rotating direction, change the FF/REW setting of the rotating direction switch.

2-6-5. PRECAUTIONS

- Turn the speed control only when necessary. Otherwise, hold the speed control turned at fully counterclockwise direction. If the power of the Mode Selector II is turned on with the speed control turned in clockwise direction, +12V power fails and the power of the Mode Selector II cannot be turned on.
- Although the connector conversion jig (J-6090-052-A) has rubber feet, do not make a short circuit on the bottom surface of the connector conversion jig via peripheral conductive materials.

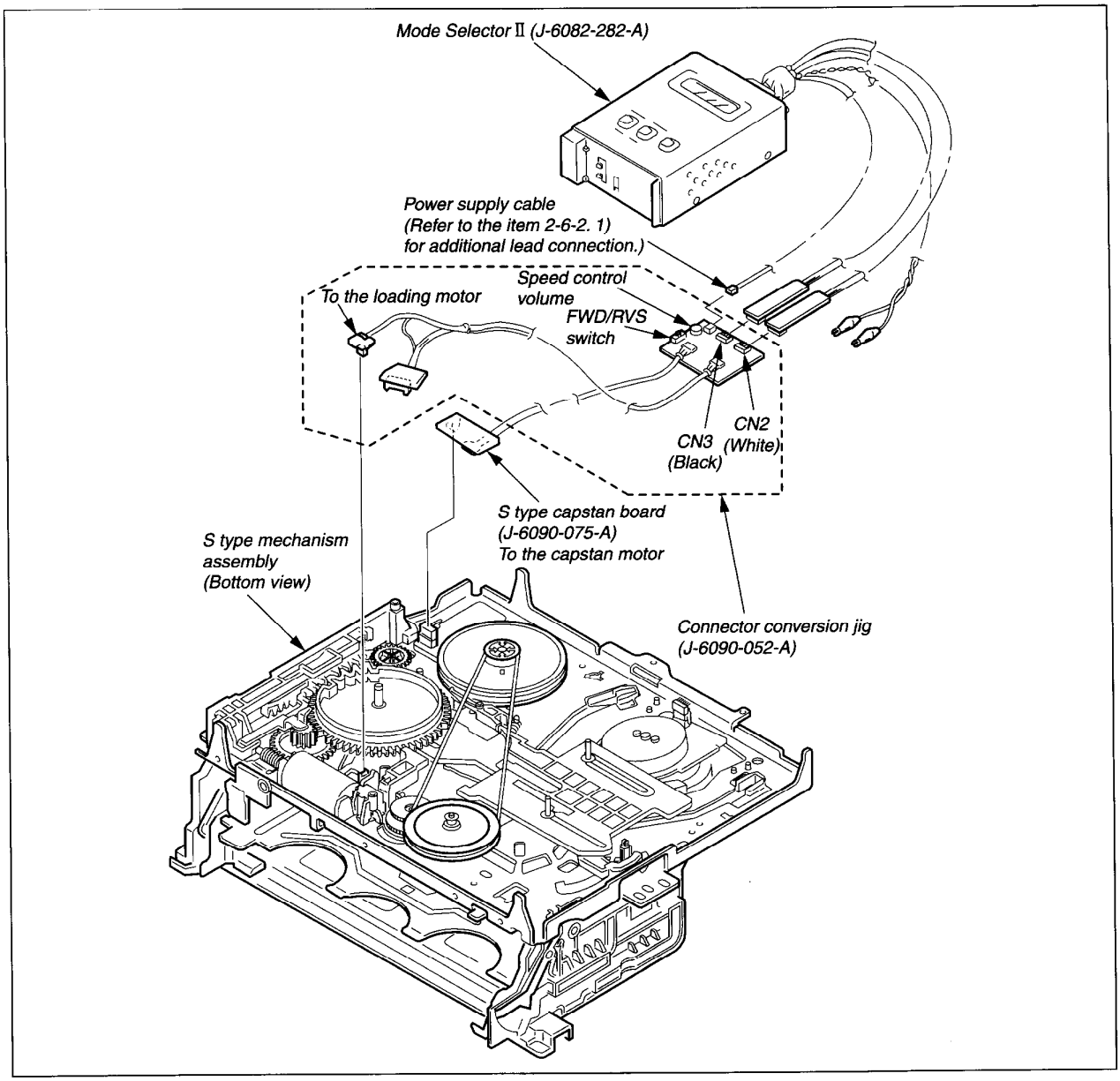


Fig. 2-3

2-6-6. CHECKING THE MECHANISM MODE BY THE MARK CARVED ON THE SLIDER

As shown in the right figure, the mechanism mode can be identified by checking the mark carved on the slider pointed by the loading gear shaft.

Carved mark	Mode
CD	Cassette down
EJ	Eject
UL	Unload end
LE	Load end
RV	Reverse
PR	Pinch release
FP	FWD pause
FW	FWD
ST	Stop
FR	FF/REW

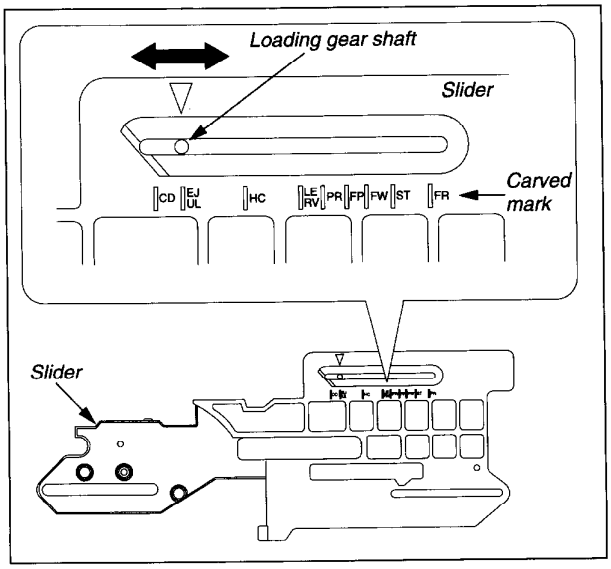


Fig. 2-4

2-7. PHASE ADJUSTMENT ON ATTACHING S TYPE MECHANISM ASSEMBLY

As shown below, adjust the phase between the rotary switch on the MA board and the cam gear.

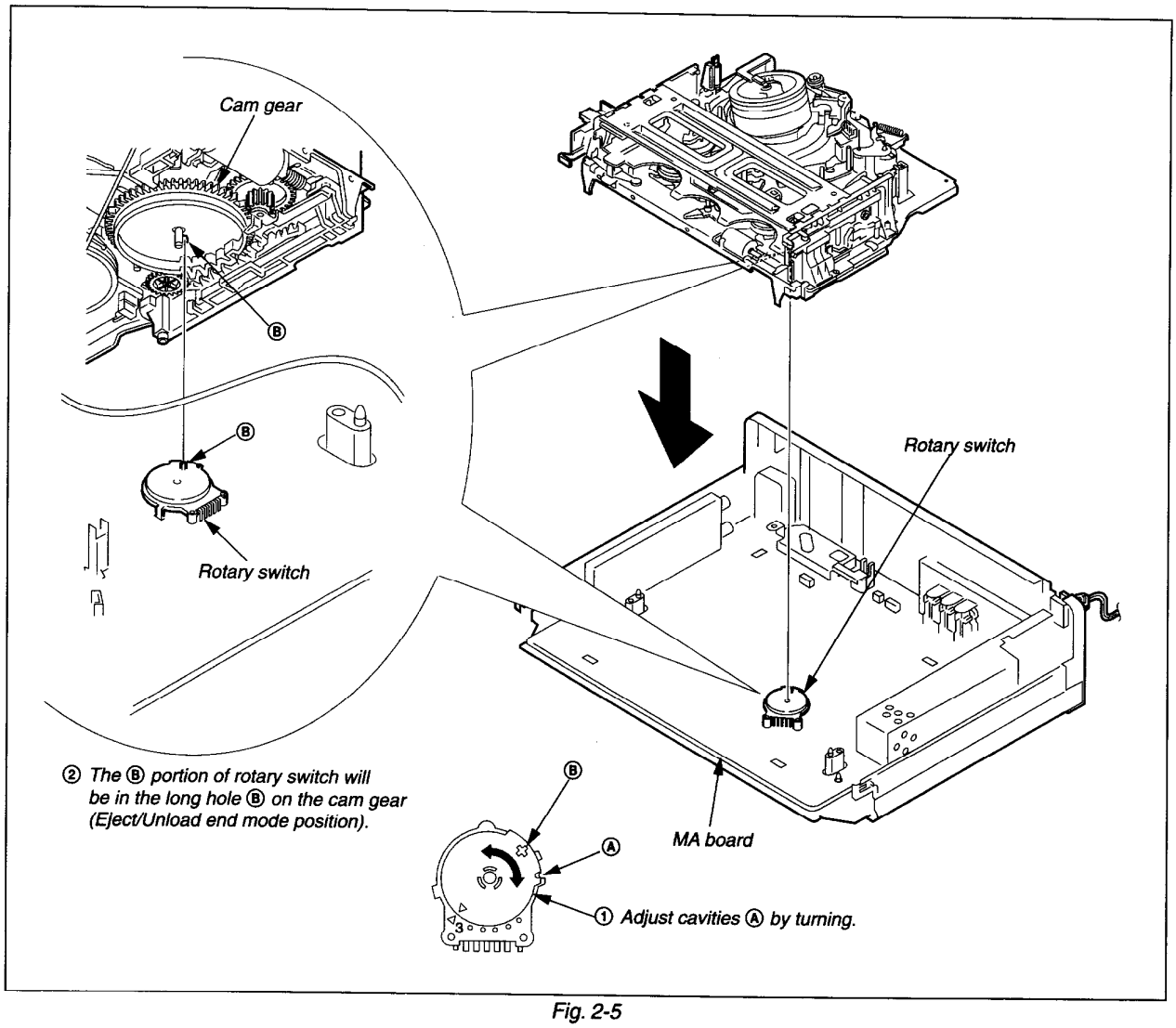

Cam gear
Ⓑ
Ⓑ
Rotary switch
Rotary switch
② The Ⓑ portion of rotary switch will be in the long hole Ⓑ on the cam gear (Eject/Unload end mode position).
Ⓑ
Ⓐ
① Adjust cavities Ⓐ by turning.
MA board

Fig. 2-5

3. MAINLY MECHANICAL PARTS REPLACEMENT

Notes:

For the removal of cabinets, printed circuit boards or the like, please refer to the "DISASSEMBLY" section on the service manual of the respective models.

To assemble the mechanical parts which are disassembled in the following sections, perform the disassembly steps in reverse, unless otherwise specified.

When replacing greased parts, grease them in the same way.

Do not oil, grease or touch with bare hands the surfaces that contacts tape of guides and brake shocs.

Install gears to engage each other.

Basically, disassembling and assembling should be done in the unthreading-end condition.

3-1. FL COMPLETE ASSEMBLY

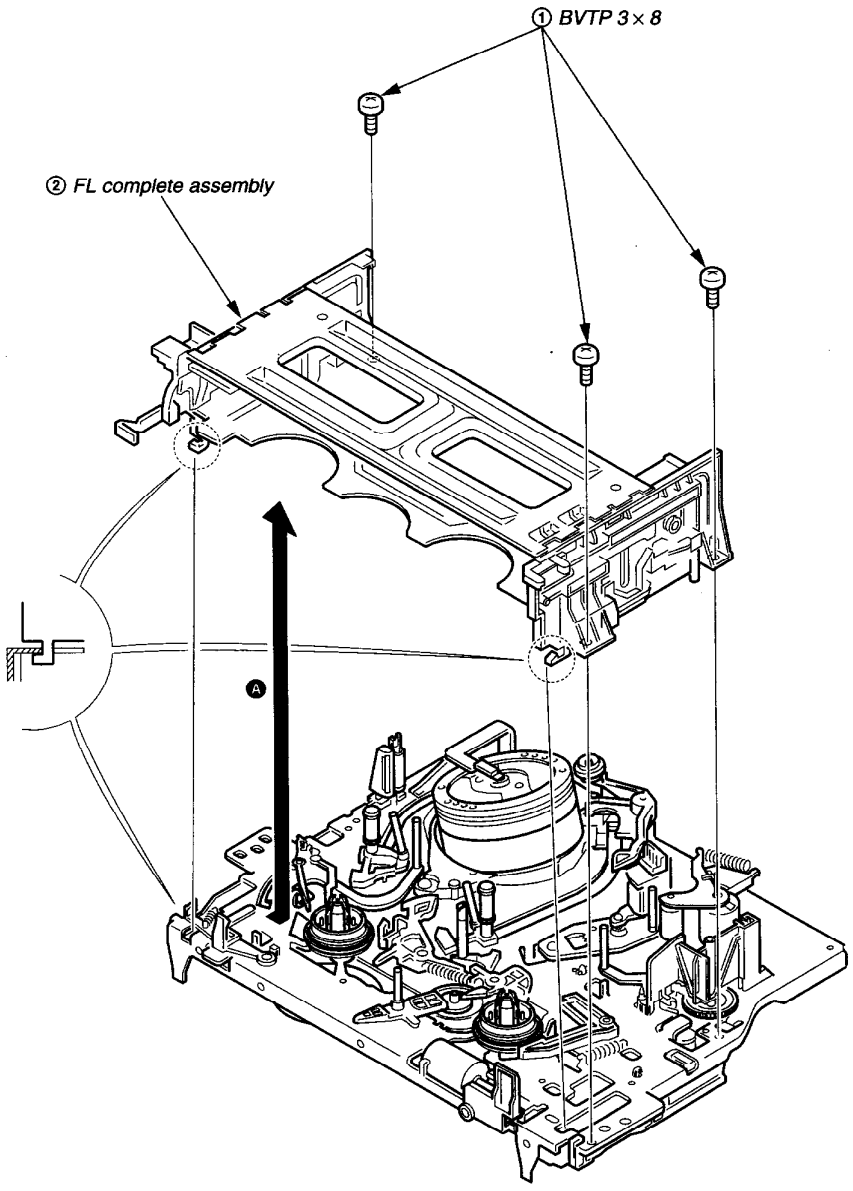
1) Remove screws (BVTP3 × 8) ①.
2) Remove FL complete assembly ② in the arrow Ⓐ direction.

Note : Be careful not to damage claws on the bottom and front.

3) Remove torsion spring (deck open) ③.
4) Remove luminous plate (top sensor) ④ and luminous plate (end sensor) ⑤.

[Note on Mounting]

- When mounting FL complete assembly, first insert claws on the bottom and front not to damage.
- Keep clean top sensor and end sensor luminous plates.



Screw tightening torque
① : 0.7845 ± 0.0784N•m (8.0 ± 0.8kg•cm)

Fig. 3-1

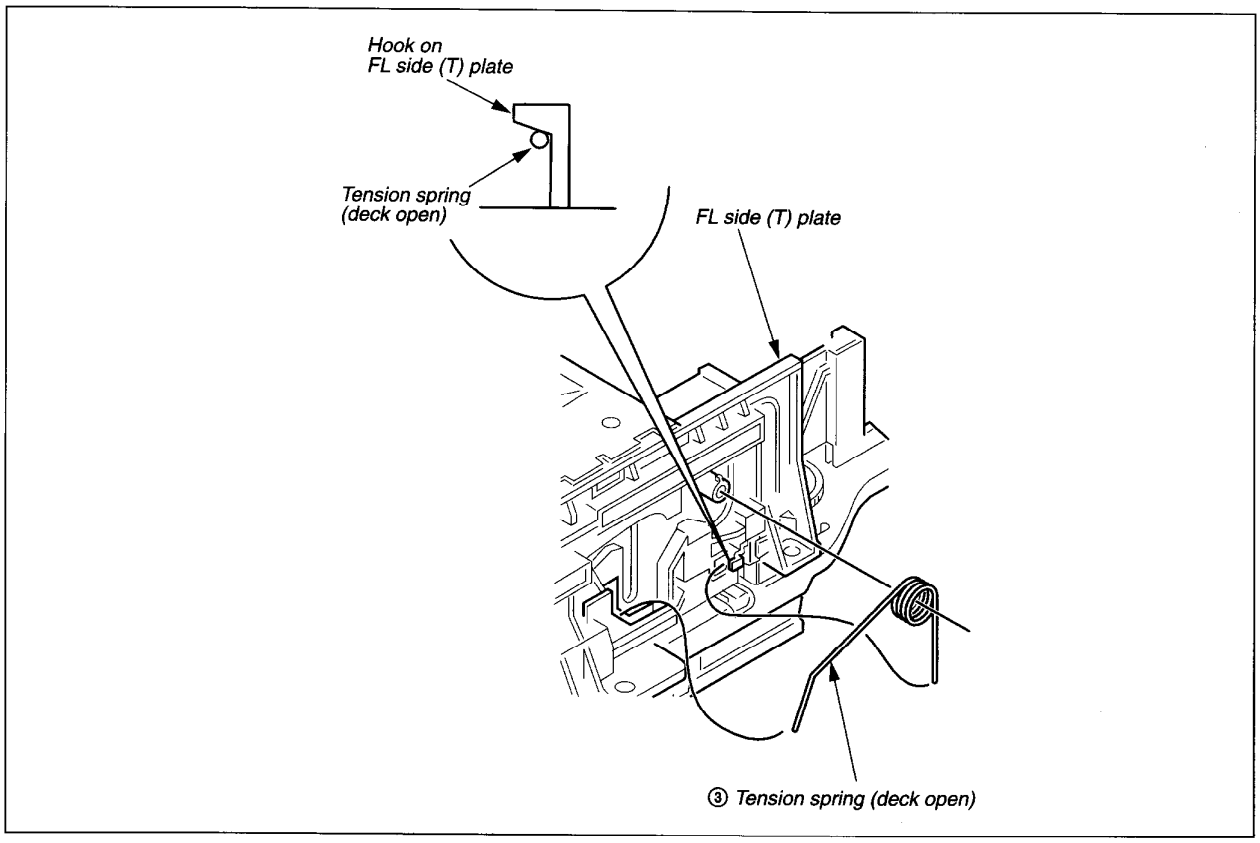

Hook on
FL side (T) plate
Tension spring
(deck open)
FL side (T) plate
③ Tension spring (deck open)

Fig. 3-2

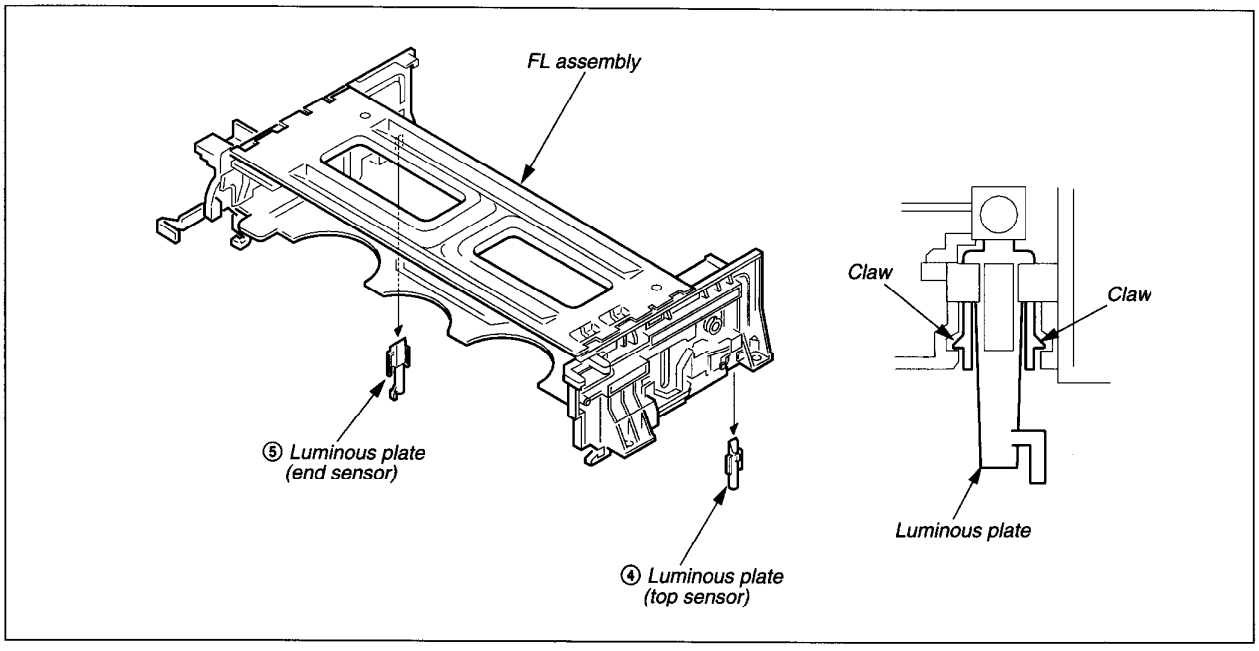

FL assembly
⑤ Luminous plate
(end sensor)
④ Luminous plate
(top sensor)
Claw
Claw
Luminous plate

Fig. 3-3

3-2. DRUM ASSEMBLY

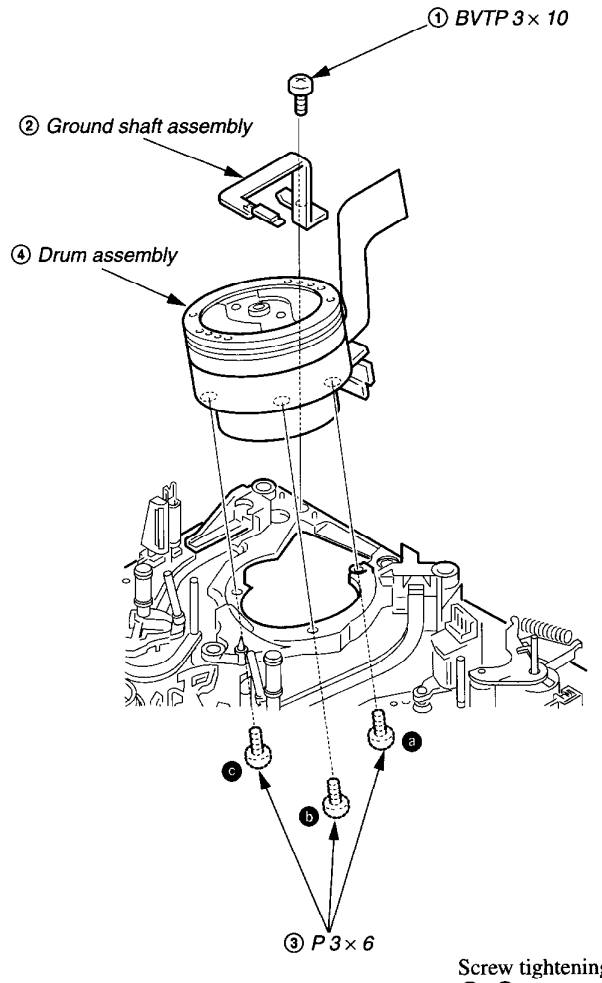
1) Remove screw (BVTP3 × 8) ①.
2) Remove ground shaft assembly ② not to touch its tip with bare hand.
3) Remove screws ③ to remove drum assembly ④.

[Notes on Mounting]

- Don't touch head chips and tip of ground shaft assembly with bare hand.
- Keep clean the surface that contacts tape of drum assembly.
- Tighten screw ③ in the order ⓐ, ⓑ, ⓒ.

[Adjusting after Mounting]

- 4-1. Tape path adjustment



Screw tightening torque
①, ③ : 0.4413 ± 0.0490N•m (4.5 ± 0.5kg•cm)

Fig. 3-4

3-3. PINCH PRESS BLOCK ASSEMBLY, TG8 ASSEMBLY AND THEIR PERIPHERY

1) Remove pinch press block assembly ① while releasing its tip from the claw of lid opener ②.
2) Remove lid opener ② while releasing claw in the arrow Ⓐ direction from mechanical chassis.
3) Remove elevator gear ③.
4) Remove TG8 assembly ④, TG8 arm gear ⑤ and TG8 arm driving gear ⑥.
5) Then remove pinch pressing gear ⑦.

[Notes on Mounting]

- When attaching pinch pressing gear ⑦ and elevator gear ③, be sure to adjust their phases as shown in Fig. A.
- Apply grease to elevator gear ⑦ and pinch shaft as shown in Fig. B.
- Don't touch surface of pinch roller with bare hand.

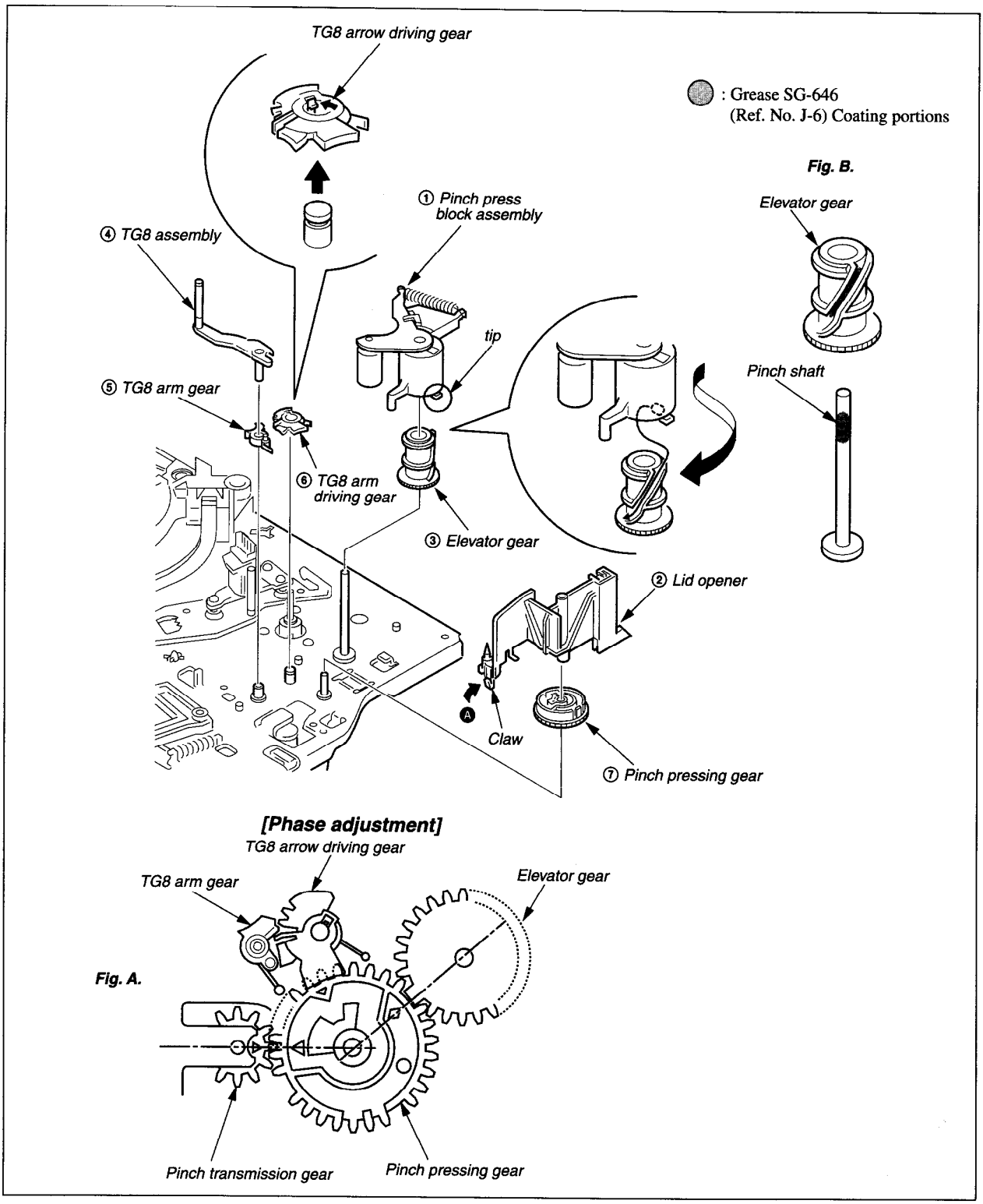


Fig. 3-5

3-4. RUBBER BELT, CAPSTAN MOTOR

1) Remove rubber belt ①.
2) Remove screws ② to pull out capstan motor ③.

[Notes on Mounting]

- Attach rubber belt not to twist it.
- Don't touch capstan motor with bare hand to keep clean capstan motor.
- Tighten screws ② in the order ⓐ, ⓑ, ⓒ.

[Adjustment after Mounting]

- 4-1. Tape path adjustment.

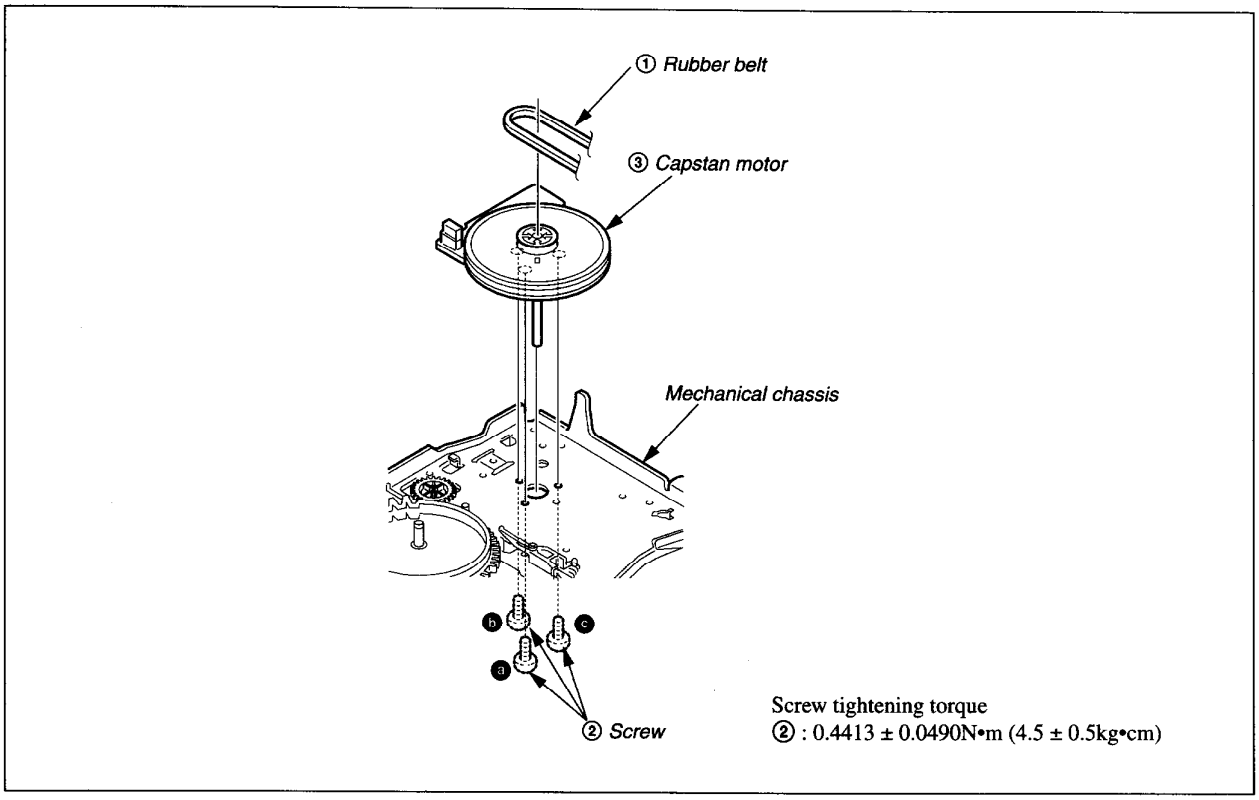


Fig. 3-6

3-5. ACE HEAD BLOCK ASSEMBLY

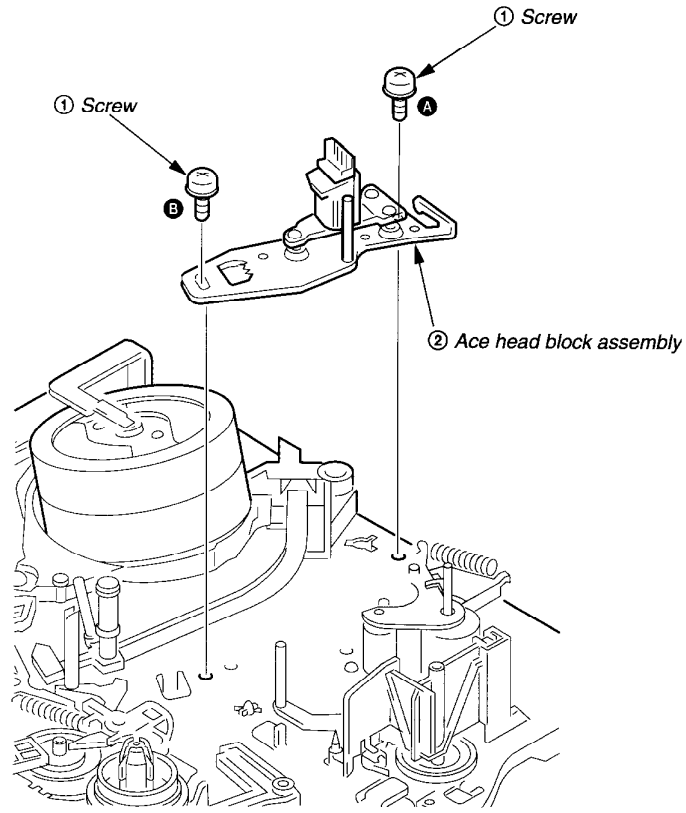
1) Remove screws ① to remove ACE head block assembly ②.

[Notes on Mounting]

- Don't touch capstan motor with bare hand to keep clean capstan motor.
- On tightening screws ①, first, tighten in the order Ⓐ, Ⓑ, next loosen Ⓑ 180 degrees or more and perform adjustments. After adjustments tighten with torque screwdriver (torque; 0.29 ± 0.29 N•m (3.0 ± 0.3kg•cm)).

[Adjustment after Mounting]

- 4-1. Tape path adjustment.



Screw tightening torque
① : 0.7845 ± 0.0784N•m (8.0 ± 0.8kg•cm)

Fig. 3-7

3-6. FEH ASSEMBLY

1) While putting the boss out from mechanical chassis, turn FEH assembly ① in the arrow Ⓐ direction and pull out FEH assembly above.
2) Slide FE head ② out from FEH holder not to break claw (Recorder only).
3) Remove TG2 shaft ③ by pushing with a screwdriver covered with cloth or the like not to scratch the surface.

[Note on Mounting]
• Don't touch FE head and TG2 shaft with bare hand.

[Adjustment after Mounting]
• 4-1. Tape path adjustment.

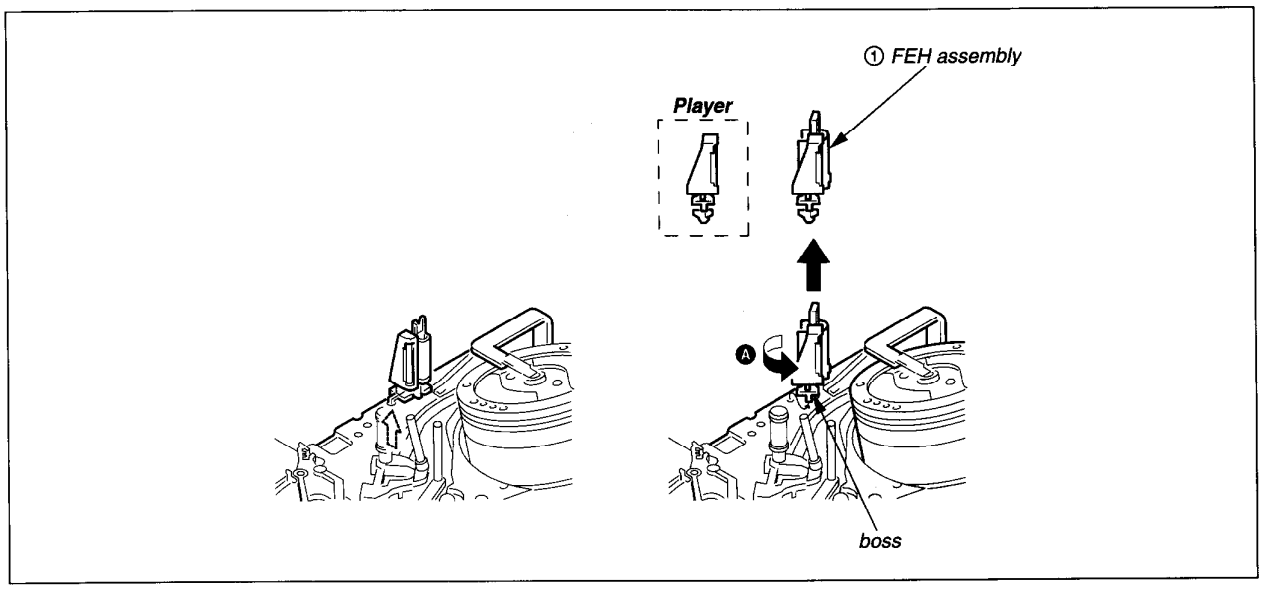


Fig. 3-8

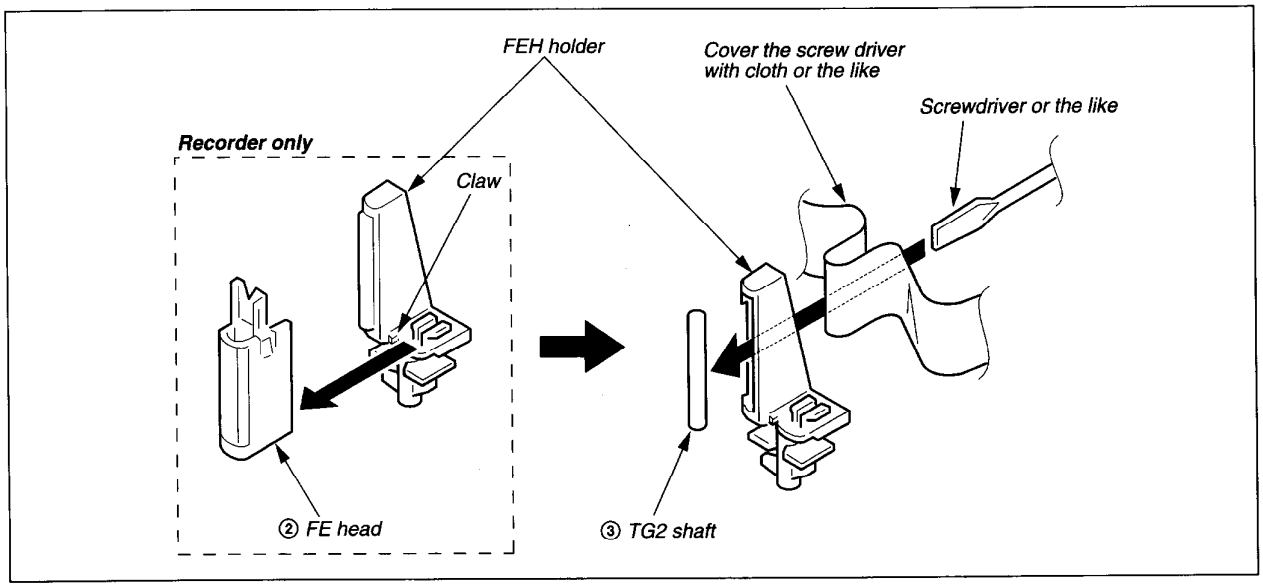


Fig. 3-9

3-7. REC PROOF LEVER

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove tension spring (REC proof) ①.
3) Remove REC proof lever ② in the arrow Ⓑ by pushing claw in the arrow Ⓐ direction.

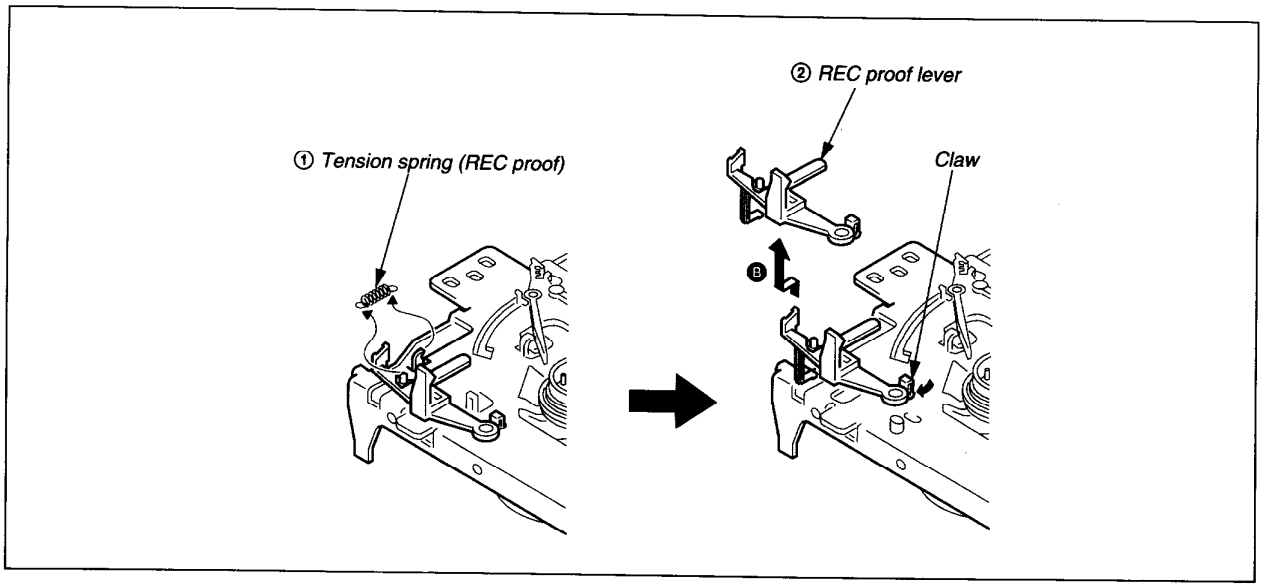


Fig. 3-10

3-8. RVS BRAKE ARM ASSEMBLY

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove extension spring (RVS brake) ①.
3) Turn RVS brake arm assembly ② in the arrow Ⓐ direction and remove it in the arrow Ⓑ.

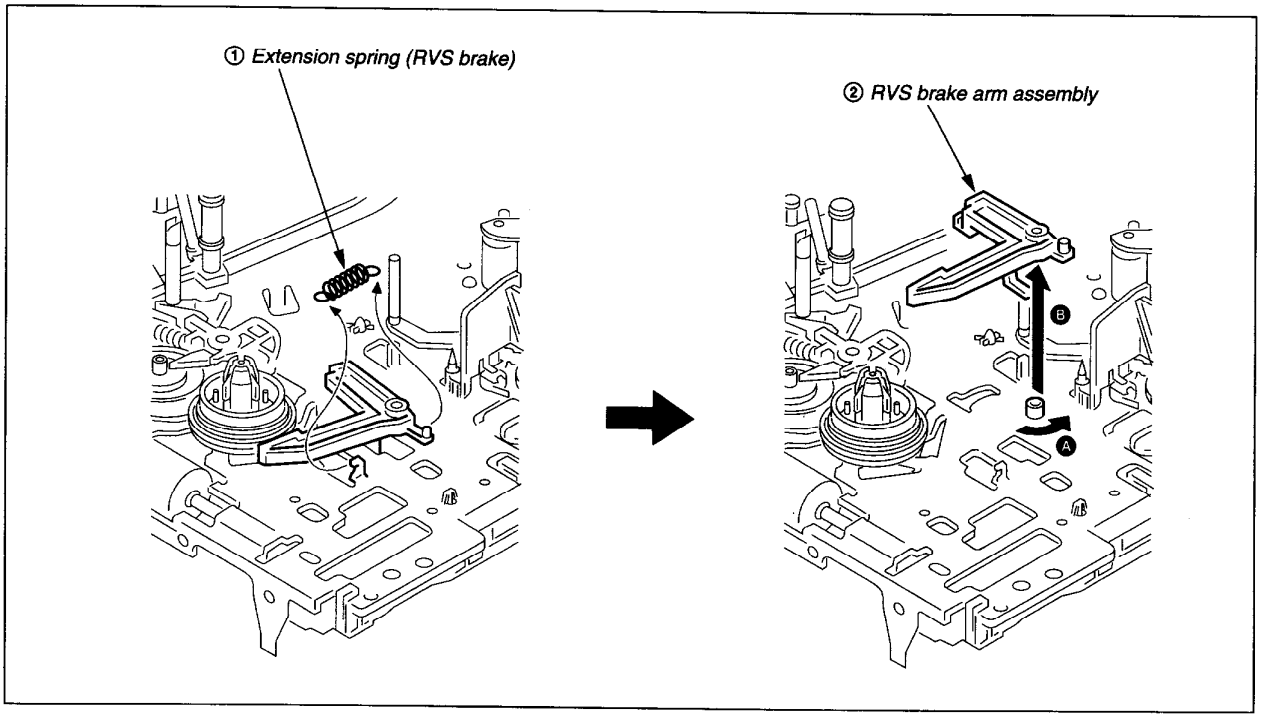


Fig. 3-11

3-9. MAIN (S) AND MAIN (T) BRAKE ASSEMBLIES

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove extension spring (main brake) ①.
3) Turn main (S) brake assembly ② in the arrow Ⓐ direction and remove it in the arrow Ⓑ.
4) Turn main (T) brake assembly ③ in the arrow Ⓒ direction and remove it in the arrow Ⓓ.

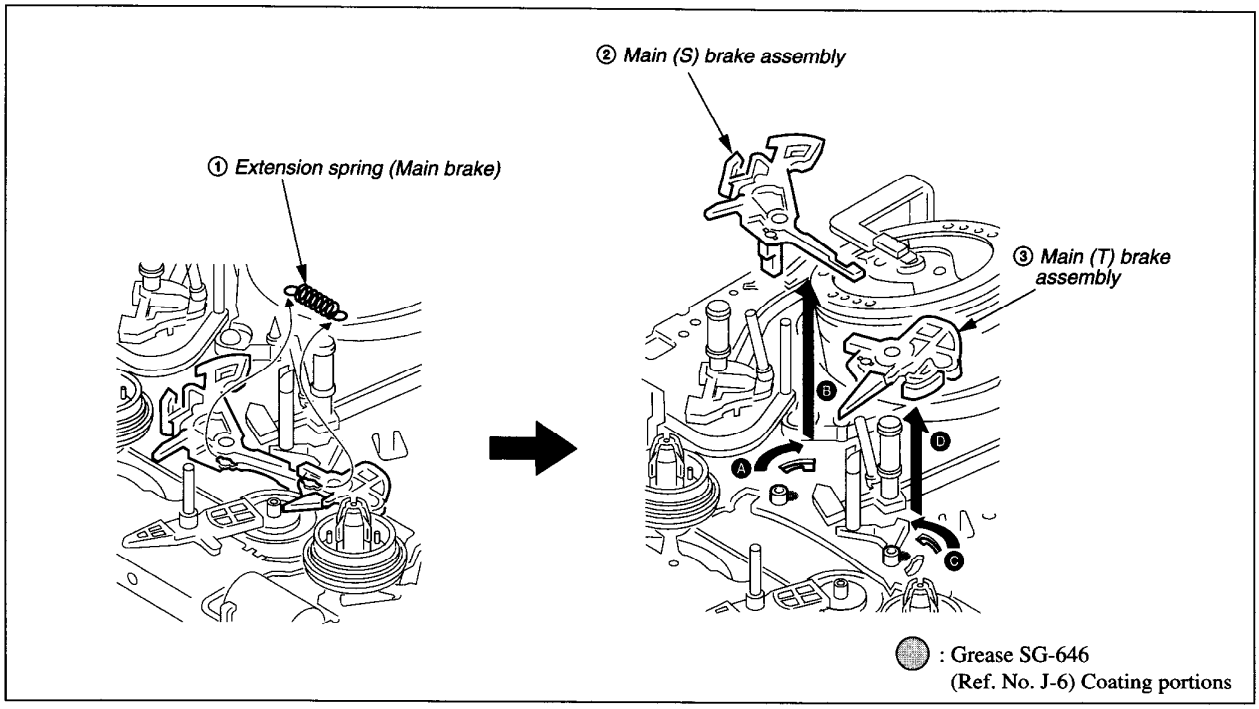


Fig. 3-12

3-10. REEL (T) TABLE (BLACK)

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove stopper washer ① to pull reel (T) table ② out.
3) Remove thrust washer ③.

[Note on Mounting]

• Before attaching, confirm the oil is applied at the top of reel (T) shaft.

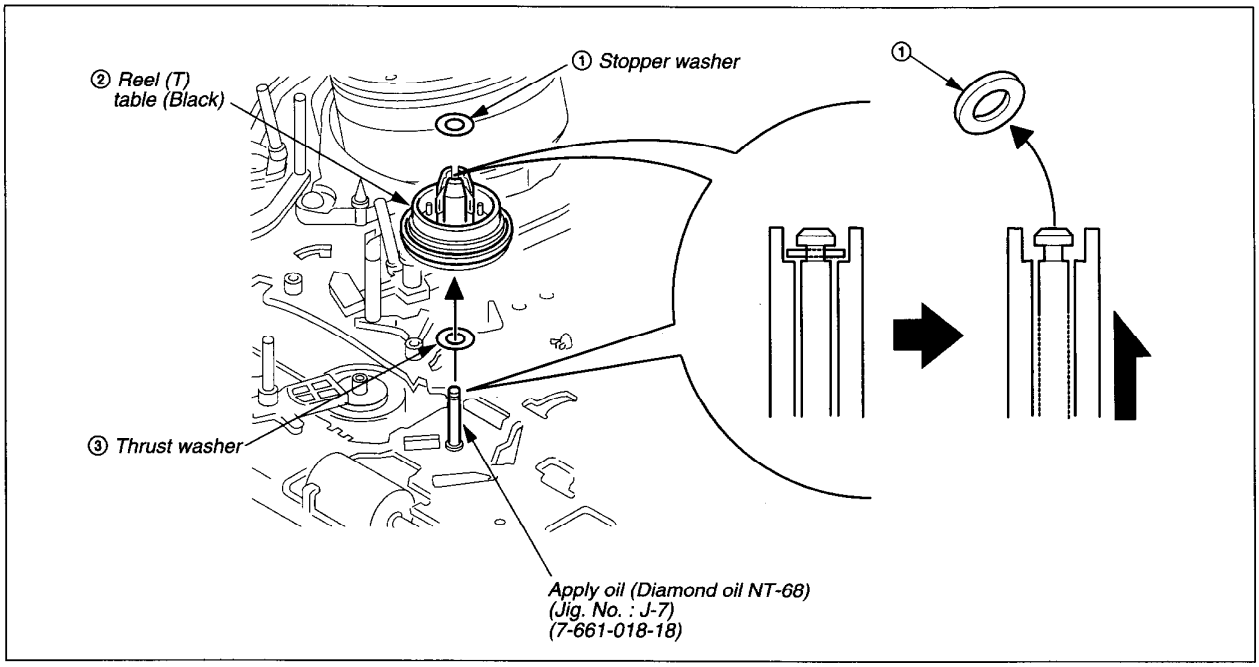


Fig. 3-13

3-11. PENDULUM ARM ASSEMBLY

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove main (S) and main (T) brake assemblies. (Refer to 3-9.)
3) While releasing claws from the pendulum arm shaft in the arrow A direction, pull out pendulum arm assembly ①.

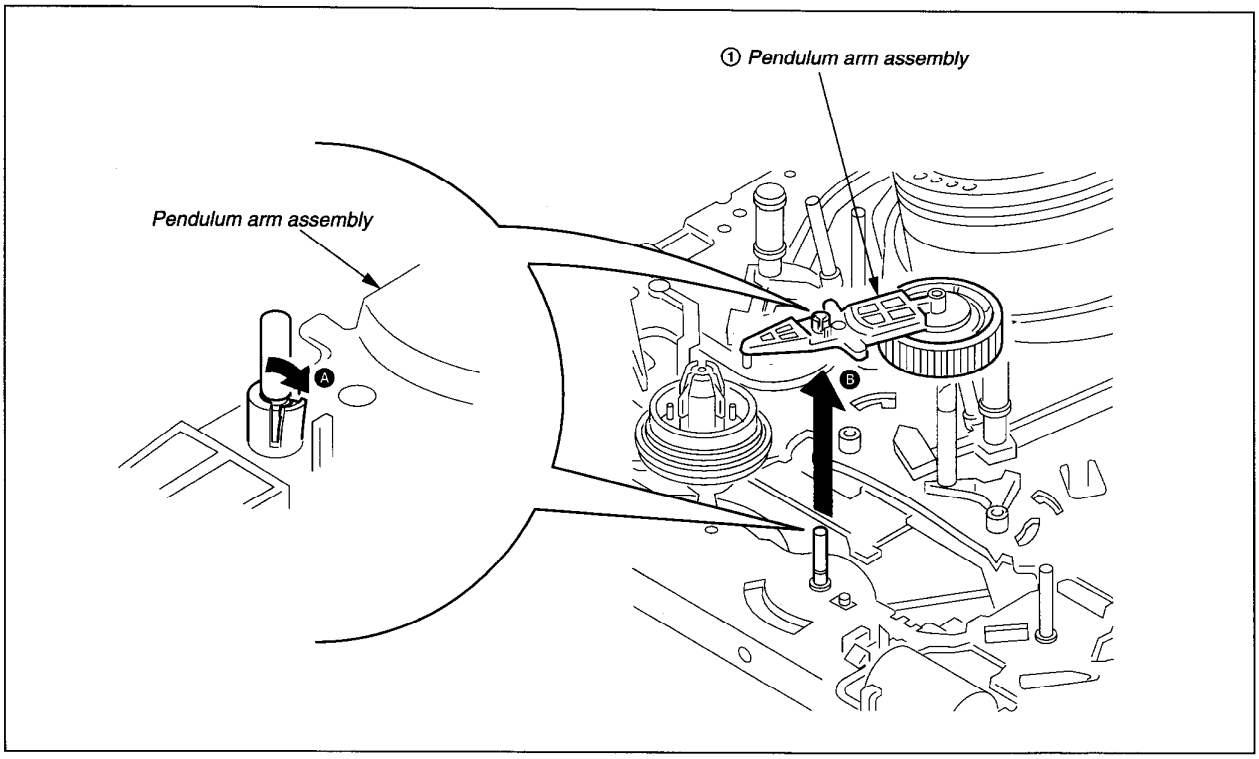


Fig. 3-14

3-12. FL SLIDER BLOCK ASSEMBLY

1) Remove FL complete assembly. (Refer to 3-1.)
2) Set the mechanism deck upside down.
3) Remove a screw (BVTP 3 × 8) ① and then retainer plate ② is getting out of place.
4) Slide FL slider block assembly ③ off in the arrow Ⓐ direction and raise it up.

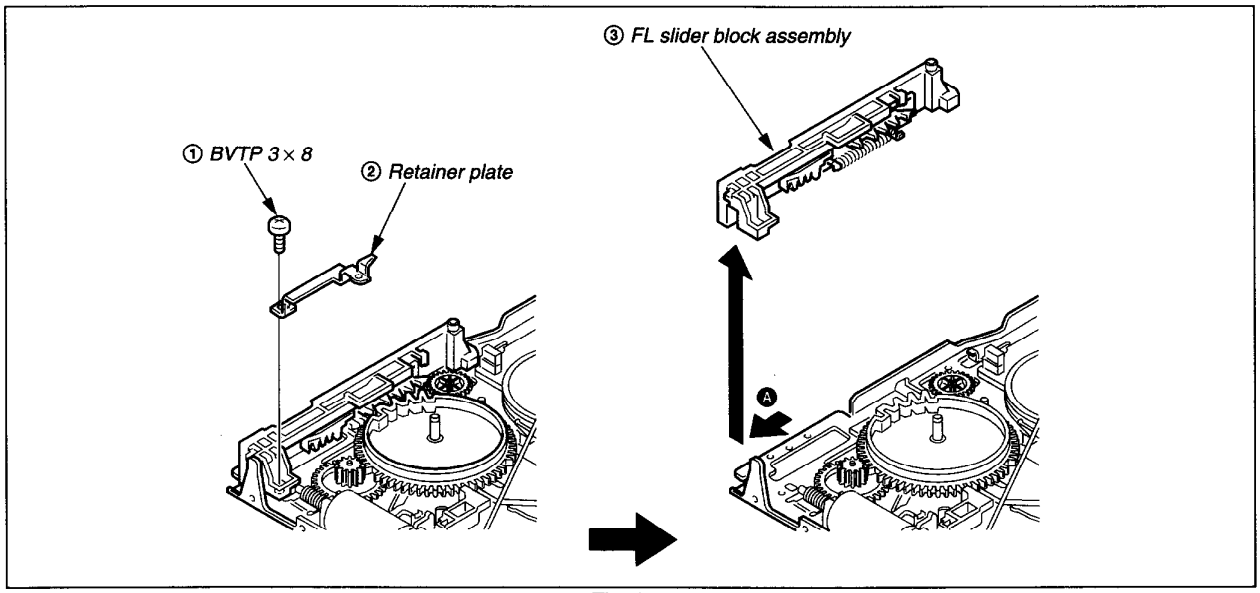


Fig. 3-15

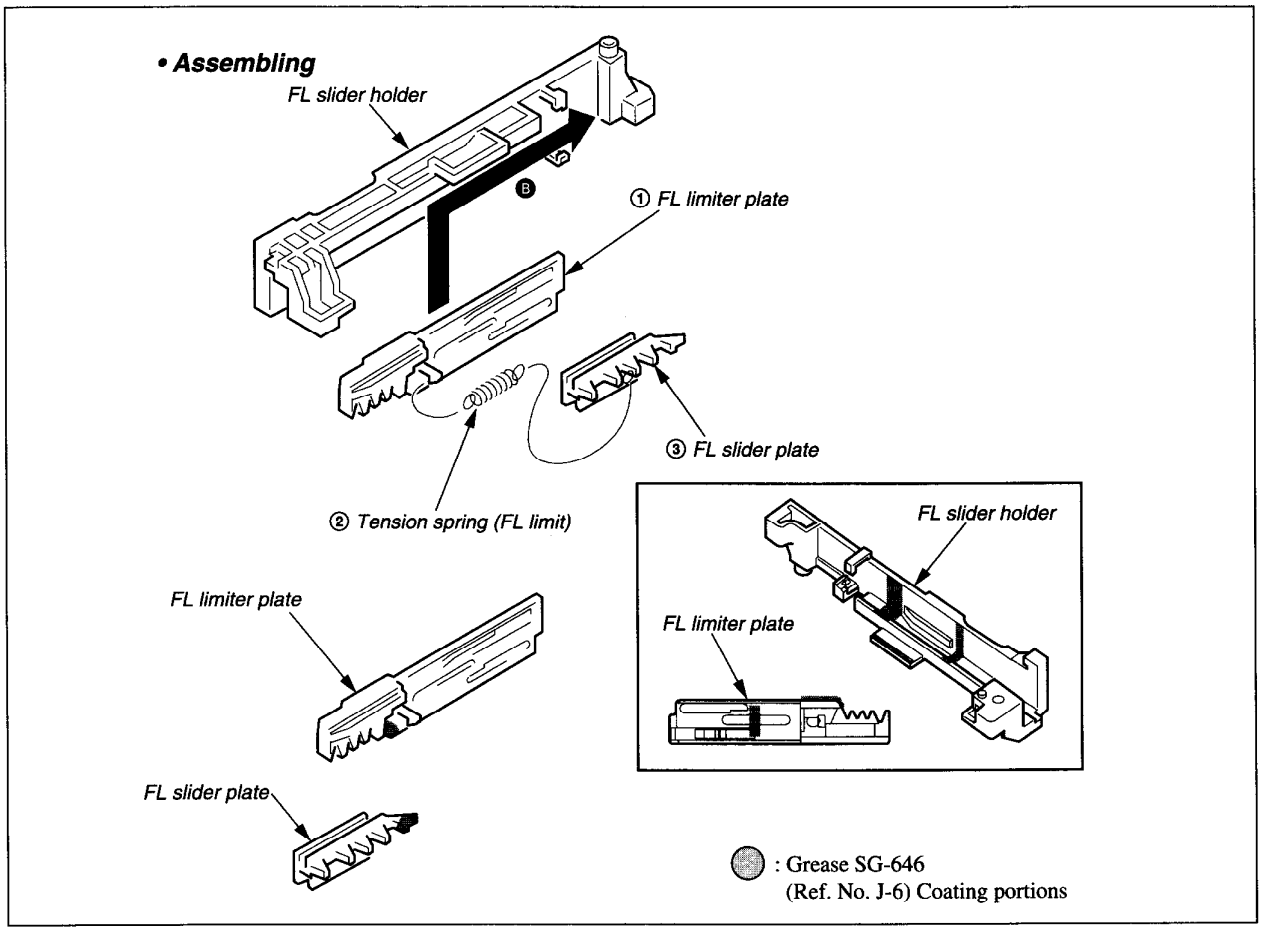


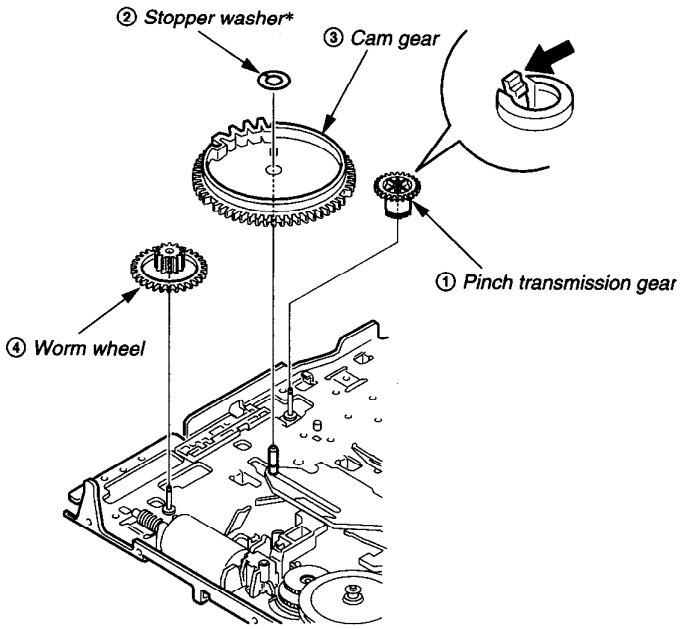
Fig. 3-16

3-13. PINCH TRANSMISSION GEAR, CAM GEAR, WORM WHEEL

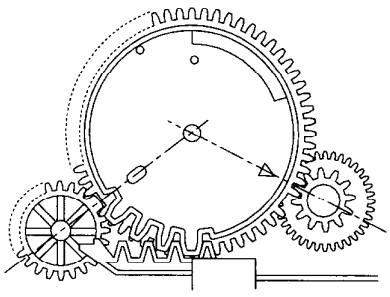
1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove FL slider block assembly. (Refer to 3-12.)
3) Remove pinch transmission gear ① by putting off its claw from shaft.
4) Remove stopper washer ②* to pull out cam gear ③.
5) Remove worm wheel ④ by putting off its claw from shaft.

[Note on Mounting]

- Before attaching cam gear ③, confirm that the specified locations are coated with grease SG-646 (Ref. No. J-6).
- Adjust the phase of gears each other.



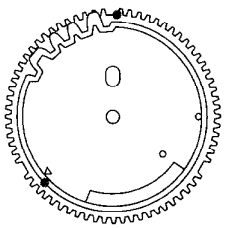
• Phase adjustment



: Grease SG-646 (Ref. No. J-6) Coating portions

*Once remove stopper washer ②, don't use it again. Replace it with new one.

[Top]



[Bottom]

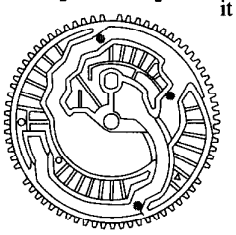


Fig. 3-17

3-14. CAPSTAN BRAKE ASSEMBLY, CAPSTAN BRAKE SHAFT

1) Remove rubber belt. (Refer to 3-4.)
2) Remove cap brake spring ①.
3) Remove capstan brake assembly ② by putting off claw of capstan brake shaft ③.
4) Set the mechanical chassis bottom side down.
5) While pushing the boss of capstan brake shaft ③, turn it clockwise to remove it.

[Note on Mounting]

• Don't touch shoe of capstan brake assembly with bare hand.

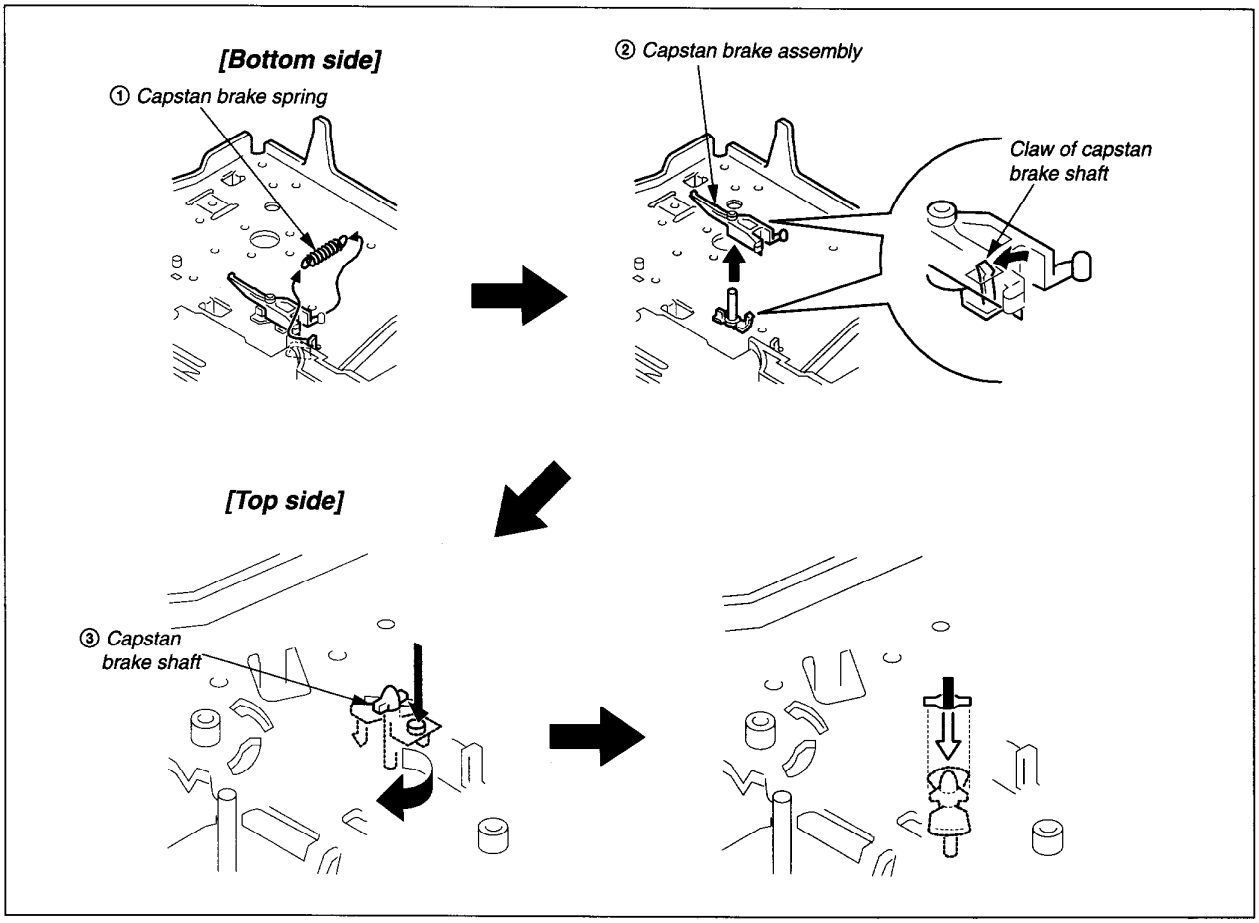


Fig. 3-18

3-15. FL SLIDER GUIDE

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove FL slider block assembly. (Refer to 3-12.)
3) Remove FL slider guide ① while pushing claws in the arrow Ⓐ direction.

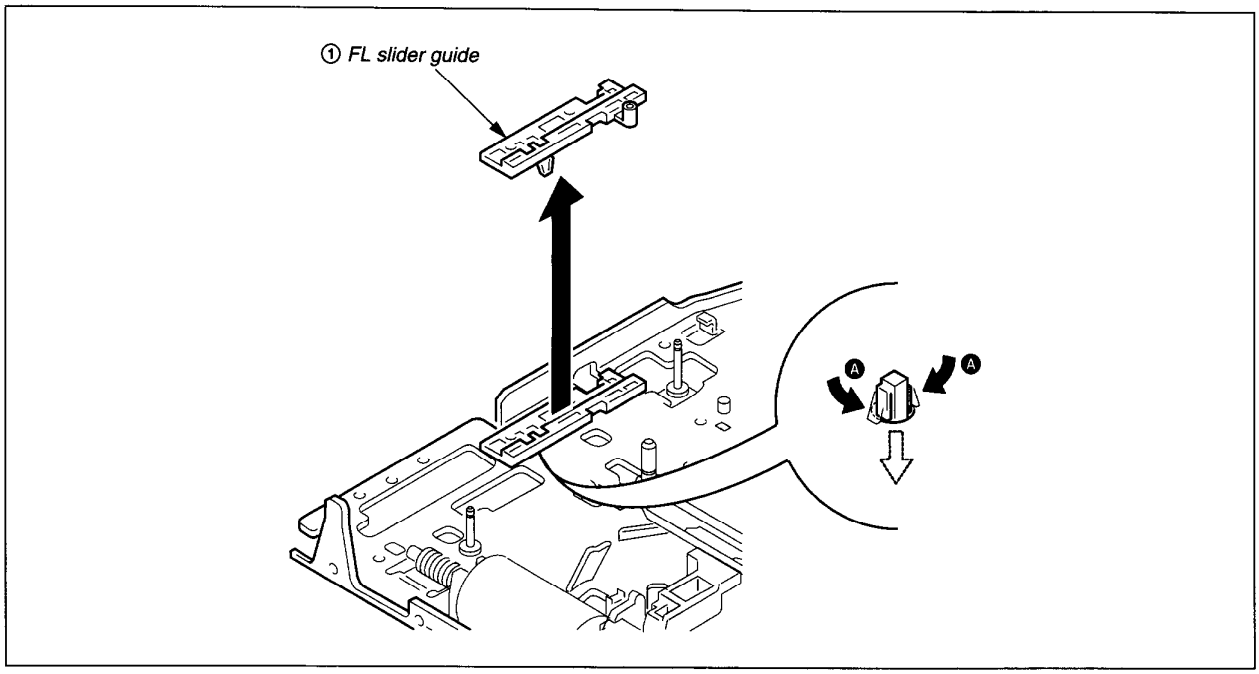


Fig. 3-19

3-16. SLIDER

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove cam gear. (Refer to 3-13.)
5) Remove stopper washers ① and remove slider ② in the arrow direction.

[Note on Mounting]

- Before attaching slider ②, confirm the specified locations are coated with grease SG-646 (Ref. No. J-6).
- When attaching slider ②, adjust "Δ" mark on slider to loading gear (T) shaft as shown in Fig. A.

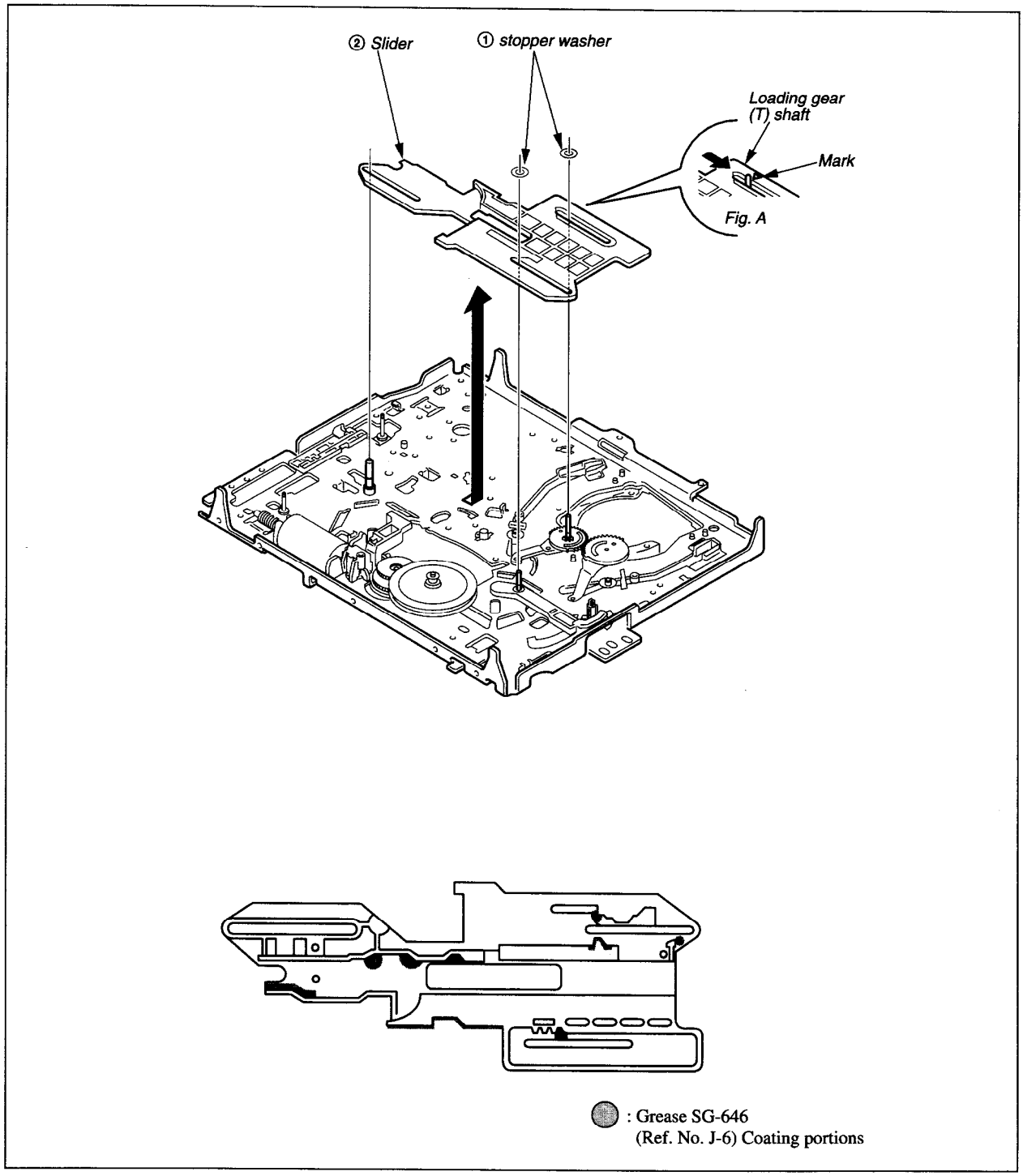


Fig. 3-20

3-17. TG1 DRIVING ARM

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove cam gear. (Refer to 3-13.)
5) Remove slider. (Refer to 3-16.)
6) Remove spring (power tension) ① from TG1 driving arm ②.
7) Remove TG1 driving arm ② by turning it in the arrow Ⓐ to Ⓑ direction.

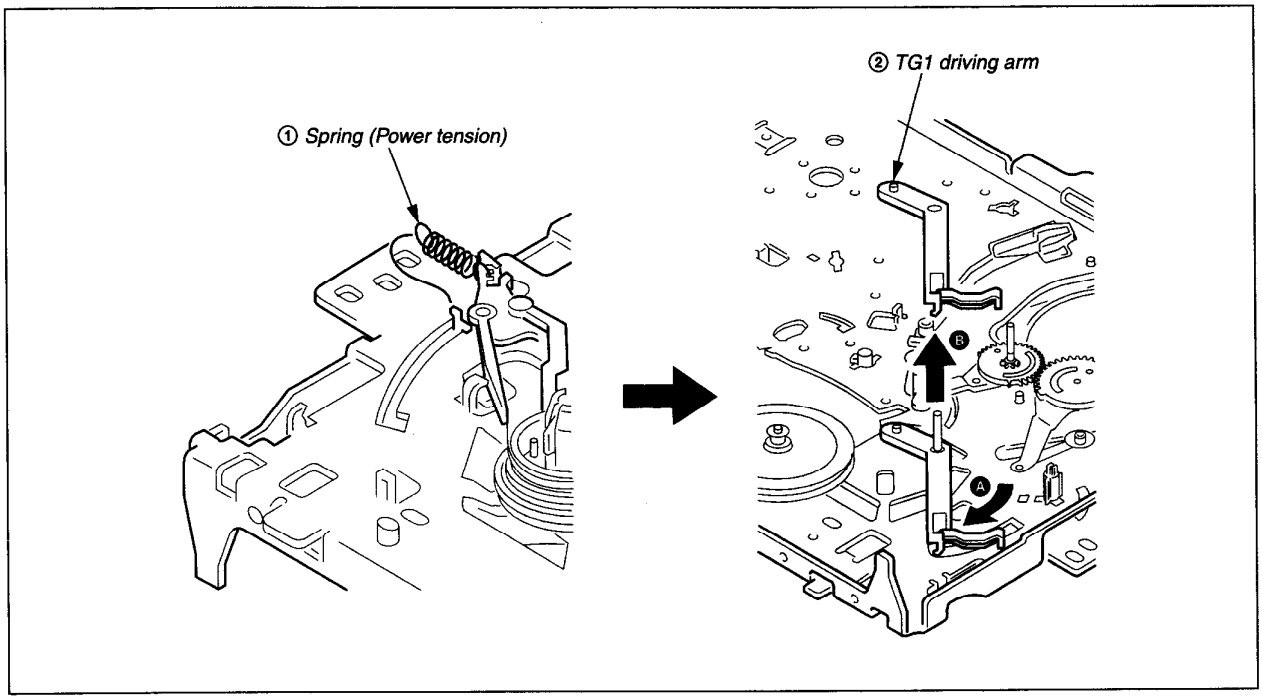


Fig. 3-21

3-18. LOADING (T) AND LOADING (S) GEAR ASSEMBLIES

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove cam gear. (Refer to 3-13.)
5) Remove slider. (Refer to 3-16.)
6) Remove loading (T) gear assembly ① and loading (S) gear assembly ② in the arrow direction.

[Note on Mounting]

• When attaching them, be sure to adjust the phase each other.

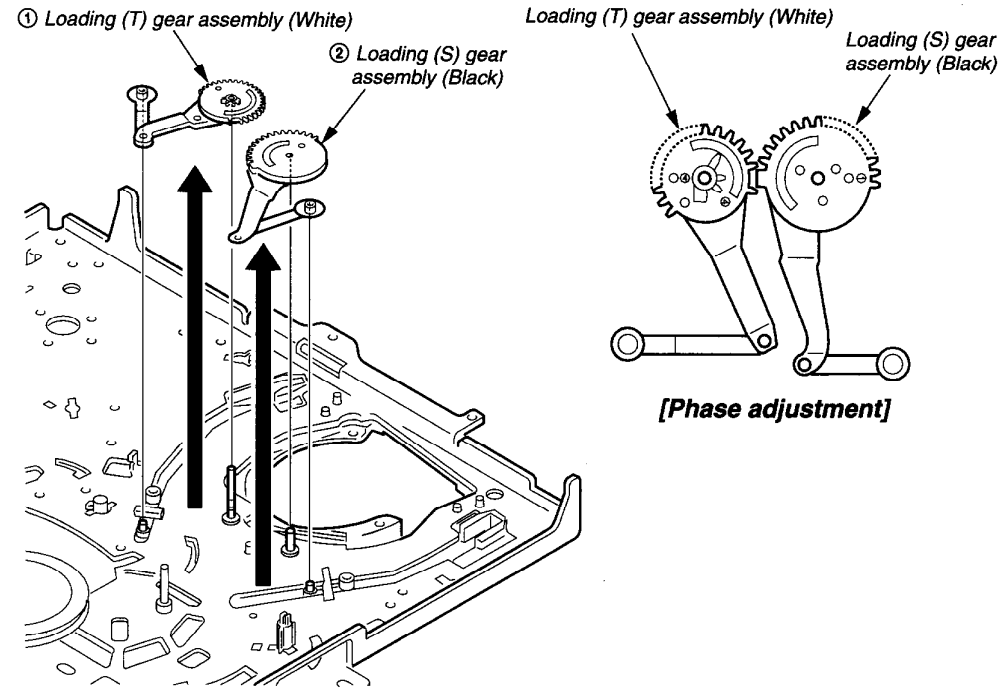

① Loading (T) gear assembly (White)
② Loading (S) gear assembly (Black)
Loading (T) gear assembly (White)
Loading (S) gear assembly (Black)
[Phase adjustment]

Fig. 3-22

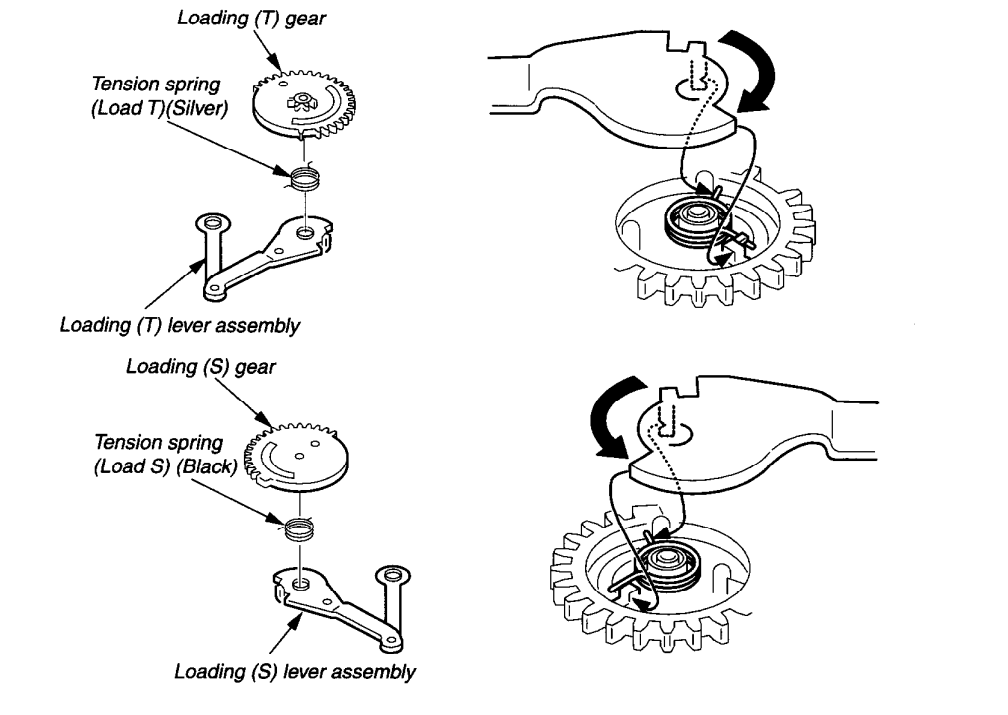


Fig. 3-23

3-19. PULLEY GEAR ASSEMBLY, CLUTCH GEAR

1) Remove rubber belt. (Refer to 3-4.)
2) Remove stopper washer ①.
3) Remove pulley gear assembly ② with clutch gear ③.

[Note on Mounting]
• When attaching them, don't insert strongly.

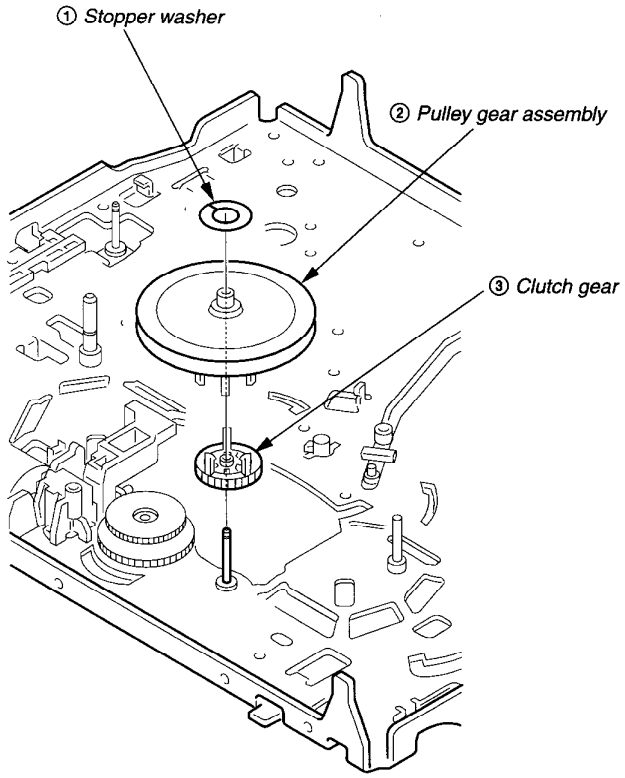


Fig. 3-24

3-20. REEL DIRECT ASSEMBLY

1) Remove rubber belt. (Refer to 3-5.)
2) Remove pulley gear assembly with clutch gear. (Refer to 3-19.)
3) Remove stopper washer ① and reel direct assembly ②.

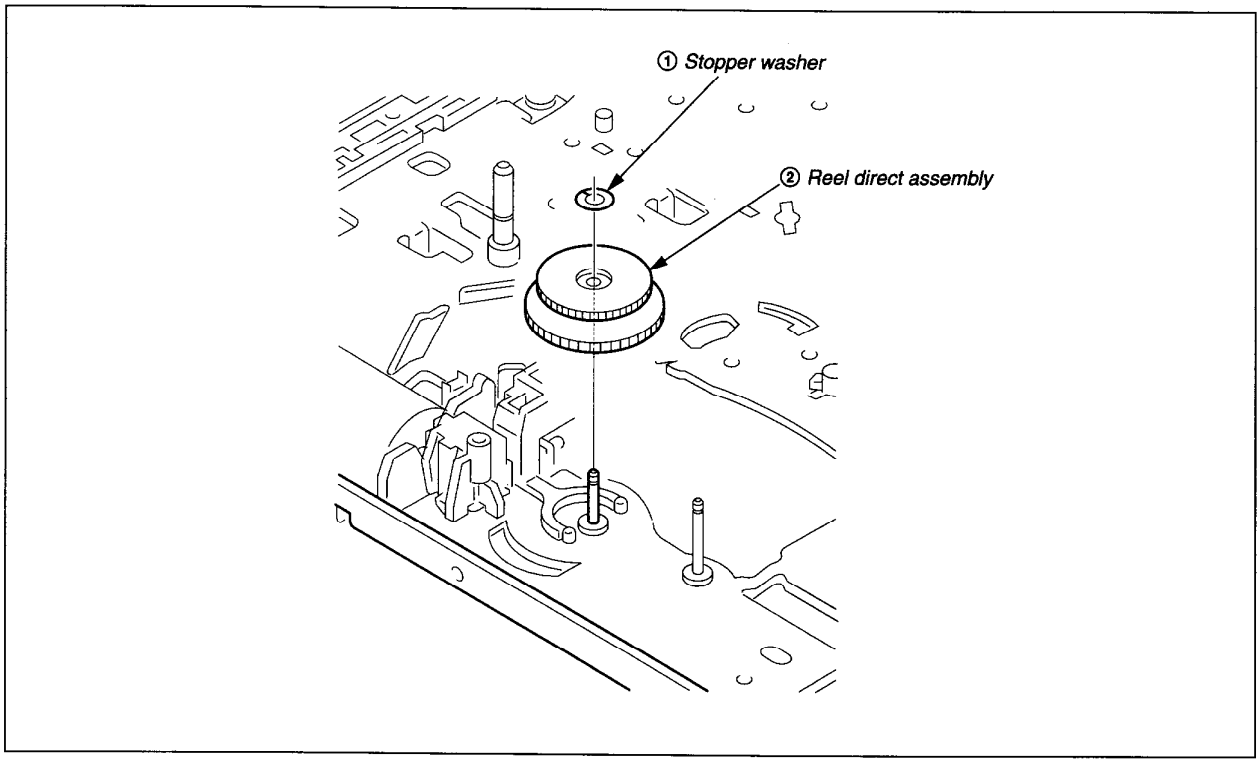


Fig. 3-25

3-21. CASSETTE GUIDE PLATE

1) Remove a screw (P 3 × 8) ① and remove cassette guide plate ②.

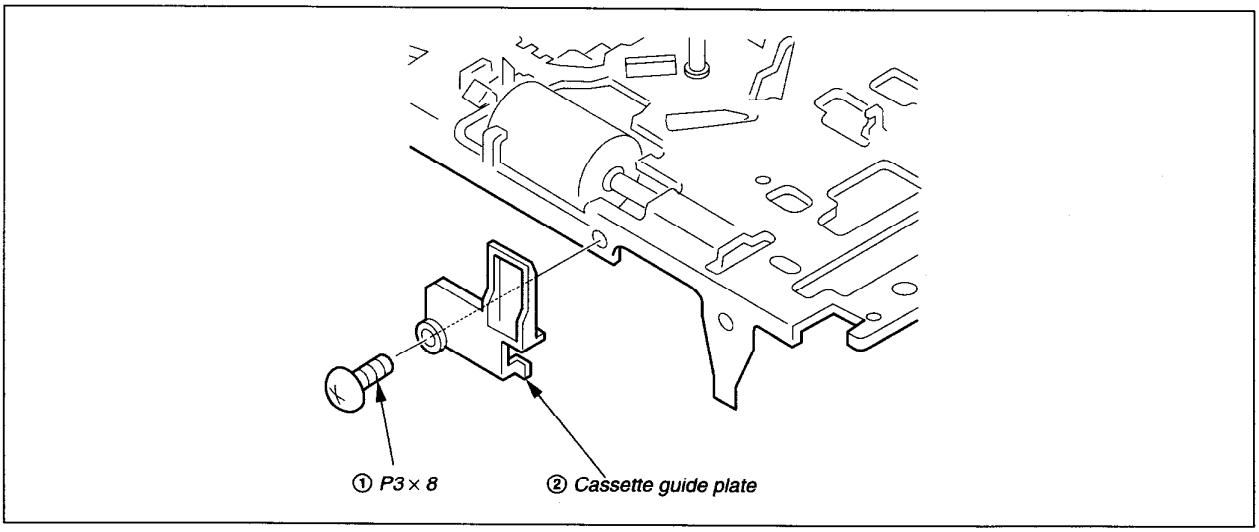


Fig. 3-26

3-23. DRUM BASE, HC ROLLER BLOCK ASSEMBLY

1) Remove the drum assembly. (Refer to 3-2.)
2) Remove screws BVTP 3 × 8 ①.
3) Remove drum base ②.
4) Pull out HC roller assembly ③ straight in the arrow Ⓐ direction.

[Note on Mounting]

- Before attaching drum base ②, confirm the specified locations are coated with grease SG-646 (Ref. No. J-6).
- Tightening screws ① in the order ⓐ to ⓑ to ⓒ.

[Adjustment after Mounting]

- 4-1. Tape path adjustment

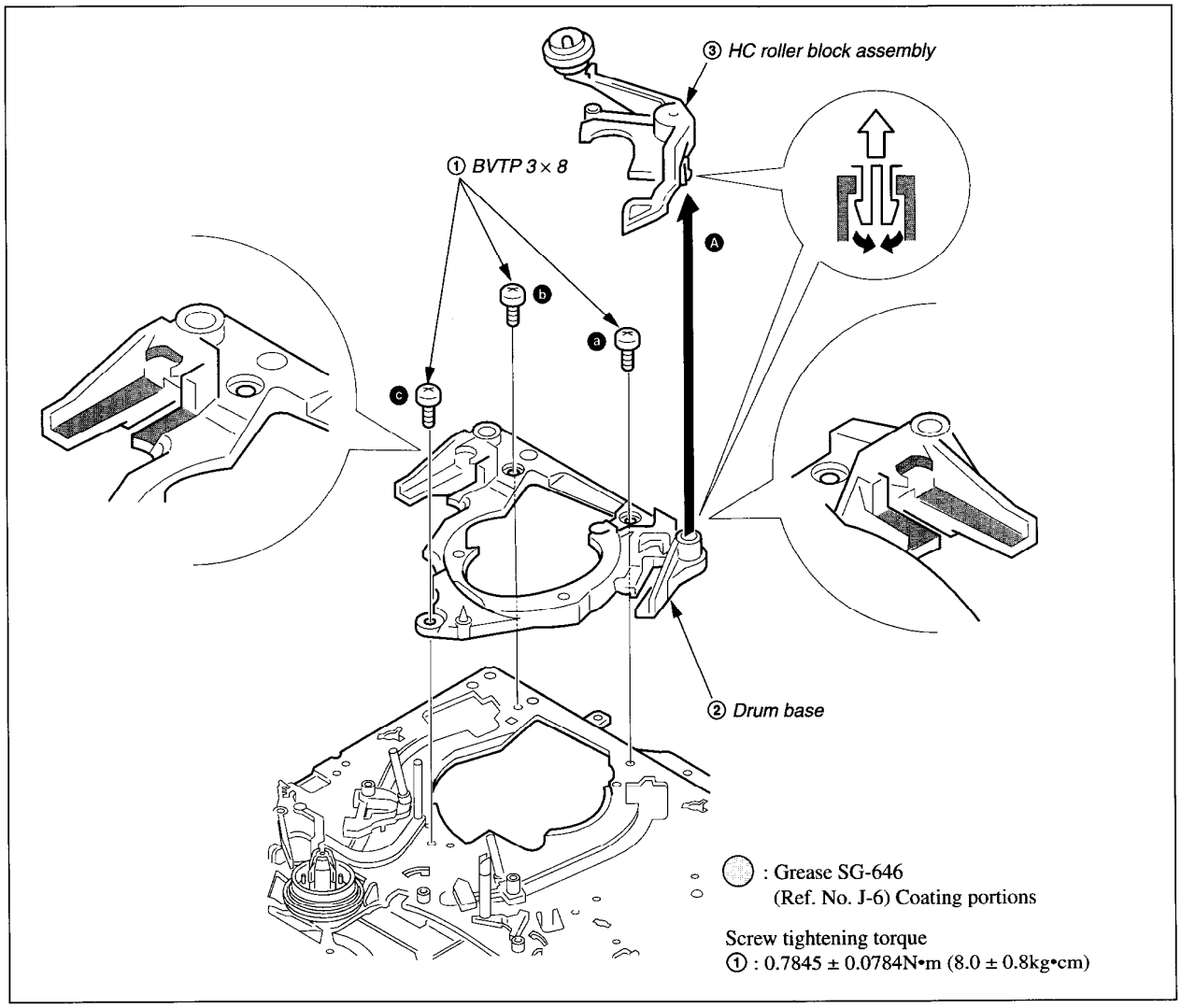


Fig. 3-28

3-24. SHUTTLE (S) AND SHUTTLE (T) BLOCK ASSEMBLIES

1. Guide Roller Assemblies

1) Turn them counterclockwise, then they are out of place, also springs.

[Note on Mounting]

Don't touch the surface that contacts tape with bare hand.

[Adjustment after Mounting]

• 4-1. Tape path adjustment

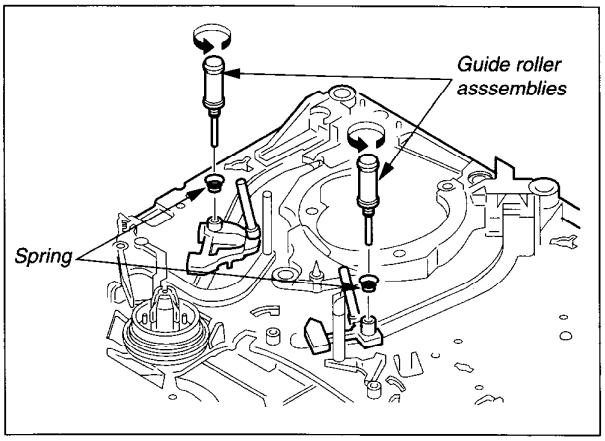


Fig. 3-29

2. Shuttle (S) and Shuttle (T) Assemblies

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove the drum assembly. (Refer to 3-2.)
3) Remove rubber belt. (Refer to 3-4.)
4) Remove FL slider block assembly. (Refer to 3-12.)
5) Remove cam gear. (Refer to 3-13.)
6) Remove slider. (Refer to 3-16.)
7) Remove loading (T) gear assembly and loading (S) gear assembly. (Refer to 3-18.)
8) Remove drum base. (Refer to 3-23.)
9) Remove shuttle (S) or shuttle (T) assembly by slide them backward.

[Note on Mounting]

Don't touch the surface that contacts tape with bare hand.

[Adjustment after Mounting]

• 4-1. Tape path adjustment

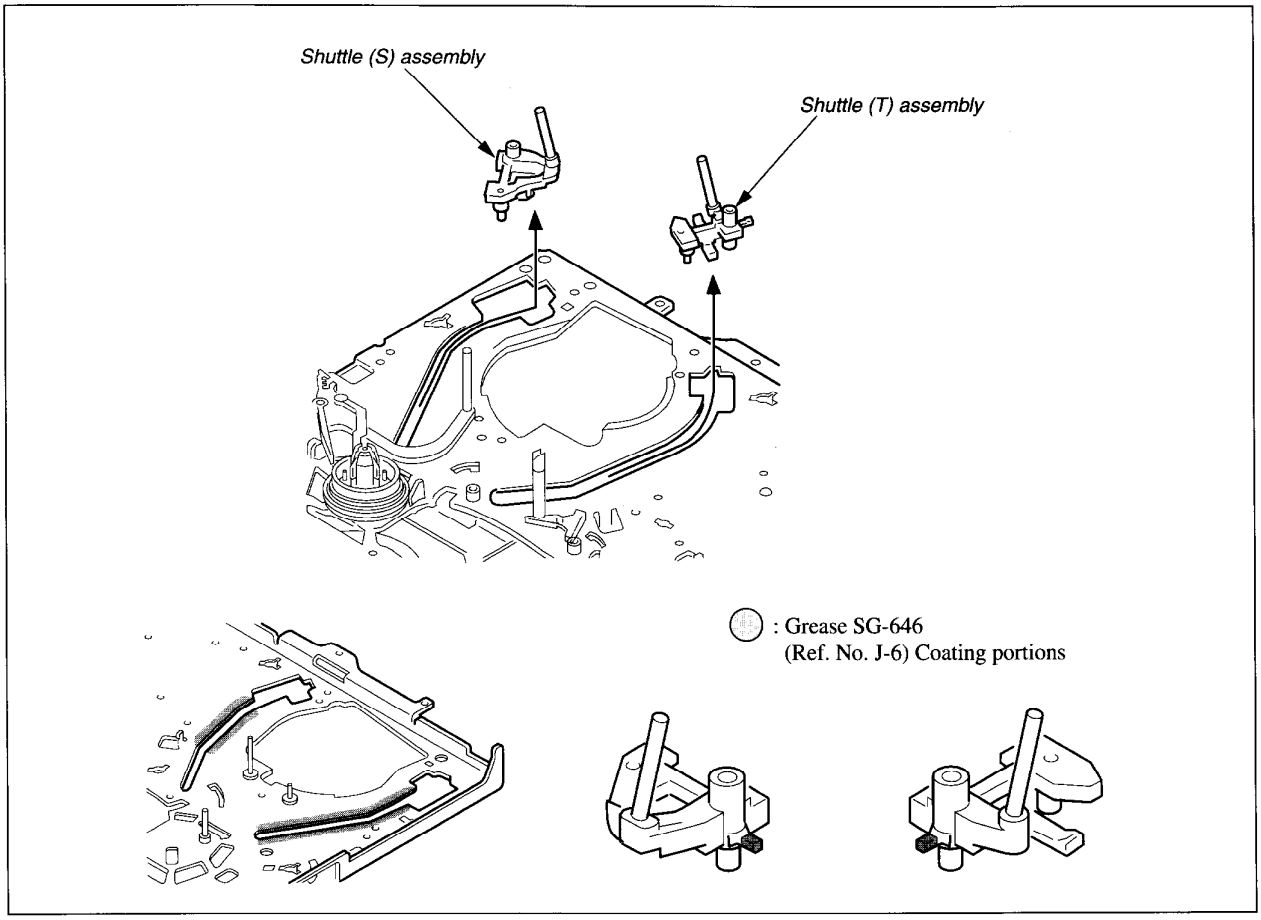


Fig. 3-30

3-25. TG1 ASSEMBLY, REEL (S) TABLE

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove spring (power tension) ① from TG1 driving arm.
3) While spreading claws on the bottom in the arrows Ⓐ direction, pull TG1 assembly ② out.
4) While spreading claws on the top in the arrows Ⓑ direction, pull reel (S) table ③ out.
5) Remove thrust washer ④.

[Note on Mounting]
Don't touch the surface that contacts tape and the braking surface of TG1 assembly with bare hand.

[Adjustment after Mounting]
• 4-1. Tape path adjustment

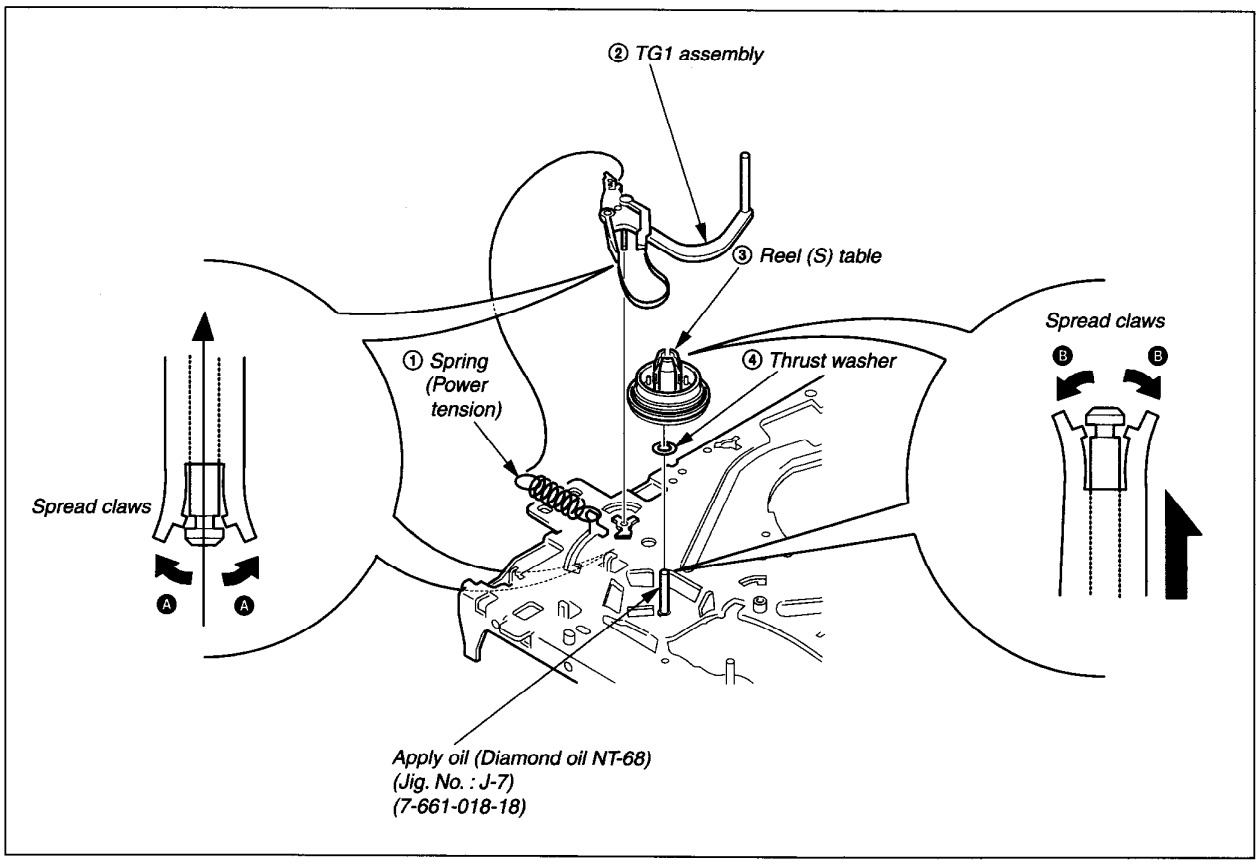


Fig. 3-31

3-26. TG1 FULCRUM BOSS

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove TG1 assembly. (Refer to 3-25.)
3) Turn TG1 fulcrum boss counterclockwise and pull it out.

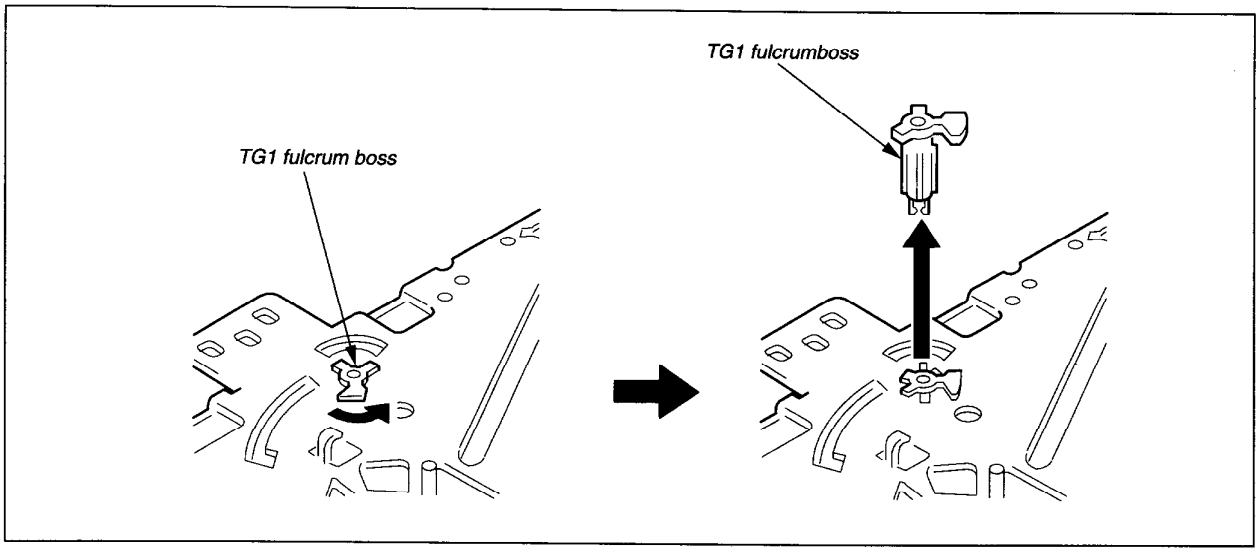


Fig. 3-32

3-27. LUMINOUS PLATE

1) Remove main (T) brake assembly. (Refer to 3-9.)
2) Turn luminous plate clockwise while raising a portion Ⓐ slightly and pull out it.

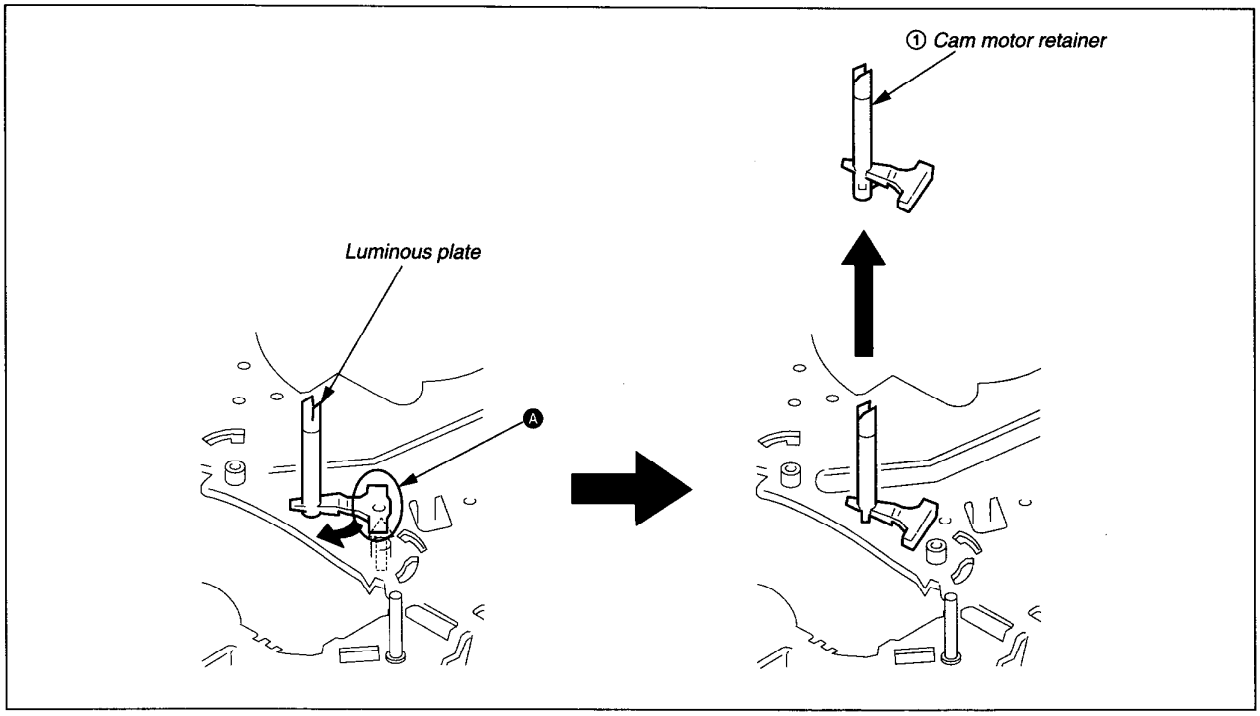


Fig. 3-33

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disc via the video heads.
Each component part of the tape transport system particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth.
The tape path system is factory pre-adjusted, when parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. TENSION REGULATOR (TG1) POSITION/ TENSION ADJUSTMENT (Fig. 4-1)

Purpose: stabilizes contact of the video head and the tape to maintain the tension of the tape so that it feeds at a constant level.

• Position adjustment

Mode	Threading is completed without a cassette loaded (Playback)
Adjustment locations	Eccentric pin of TG1 band assembly

[Adjustment Method]

1) Allow the unit to go through the threading procedure without a cassette loaded.
2) Set the unit to play back, then turn the eccentric pin so that the tip of tension arm goes to the left side line carved on the mechanical chassis. (Fig. A)
3) After adjustment, go through the loading procedure once more without a cassette loaded, then check the position of the tension arm.

• Tension adjustment

Mode	Playback (SP)
Measuring instrument/tool	Torque cassette VHT-103S (Ref. No. J-1)
Adjustment locations	Position for hooking the tension spring
Specified value	5.05 to 6.52 mN•m (51.5 to 66.5g•cm) (without TC assembly) 3.78 to 5.10 mN•m (38.5 to 52.0g•cm) (with TC assembly)

[Adjustment Method]

1) Playback the torque cassette.
2) Check that the center value deviation reading on the torque cassette meets with the standards.
3) When the reading is higher than the standards : Move the spring toward direction Ⓐ.
   When the reading is less than the standards : Move the spring toward direction Ⓑ.

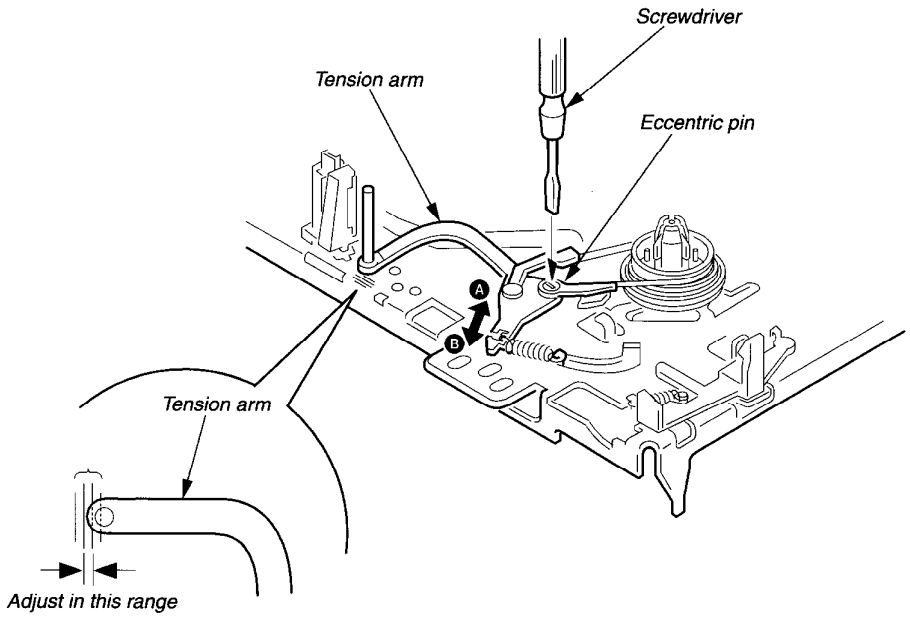


Fig. A

Fig. 4-1

4-1-2. CHECKING THE TENSION AND TORQUE

Purpose : To check that the tension, torque and compression force of the tape take-up section and mobile sections to ensure smooth tape run and achieve standard VTR performance.
If the tape transport is not smooth or problems occur in relation to the tape transport speed, perform the following check.

Mode	Each operation mode
Measuring instrument	Torque cassette VHT-103S, VHT-404S

Item	VTR operation mode	Reel to be measured	Measurement value
Review torque	Review	S reel	12.7 to 19.6 mN•m (130 to 200 g•cm)
Take-up torque	Playback	T reel	4.41 to 10.8 mN•m (45 to 110g•cm)
Back tension torque	Playback	S reel	See section 4-1-1.

4-1-3. X-VALUE ADJUSTMENT (Using the tape having the version No.)

Purpose: To obtain compatibility with other VCRs.

Precaution: Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the [▲] and [▼] tracking control keys, press both the [▲] and [▼] tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking [AUTO/MANUAL] key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape: KRV-52NE (NTSC)/ 52PL(PAL)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH1: Connector PB RF pin for RF PC board check CH2: Connector RF SWP pin for RF PC board check
Adjustment locations	ACE base assembly

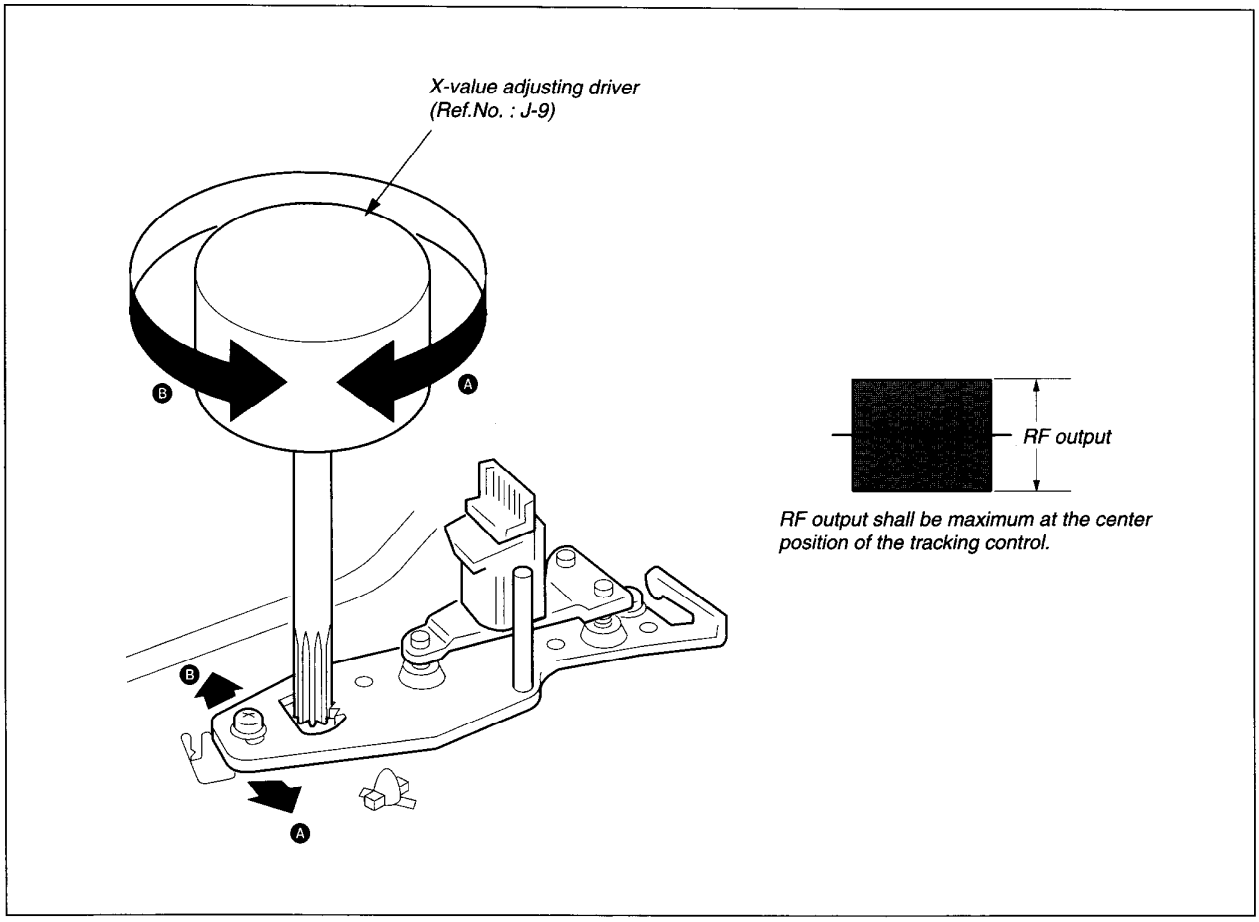


Fig. 4-2

[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with standard gap video heads, set the ACE head position with X-value adjusting driver where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the ACE head position with X-value adjusting driver both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

* TYPE OF DRUM

DZH-68D	DZH-89A
DZH-71D	DZH-90A
DZH-77A	DZH-91A
DZH-78A	DZH-92A
DZH-78B	

1. Adjusting X-value (Using the tape having the version No.)

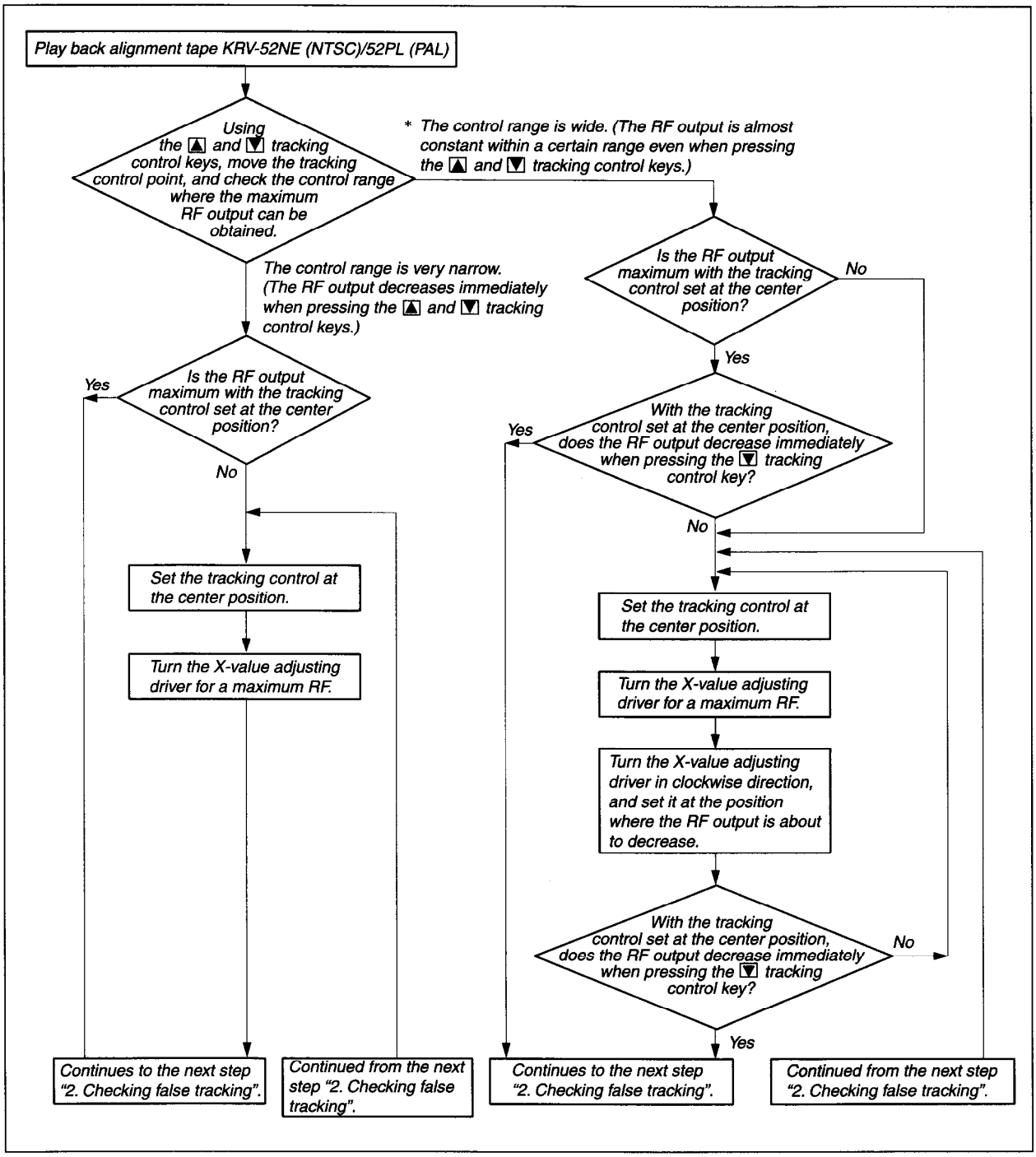

Play back alignment tape KRV-52NE (NTSC)/52PL (PAL)
Using the ▲ and ▼ tracking control keys, move the tracking control point, and check the control range where the maximum RF output can be obtained.
* The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF.
Turn the X-value adjusting driver in clockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
No
Yes
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".

Table. 4-1

2. Checking false tracking
(Using the tape having the version No.)

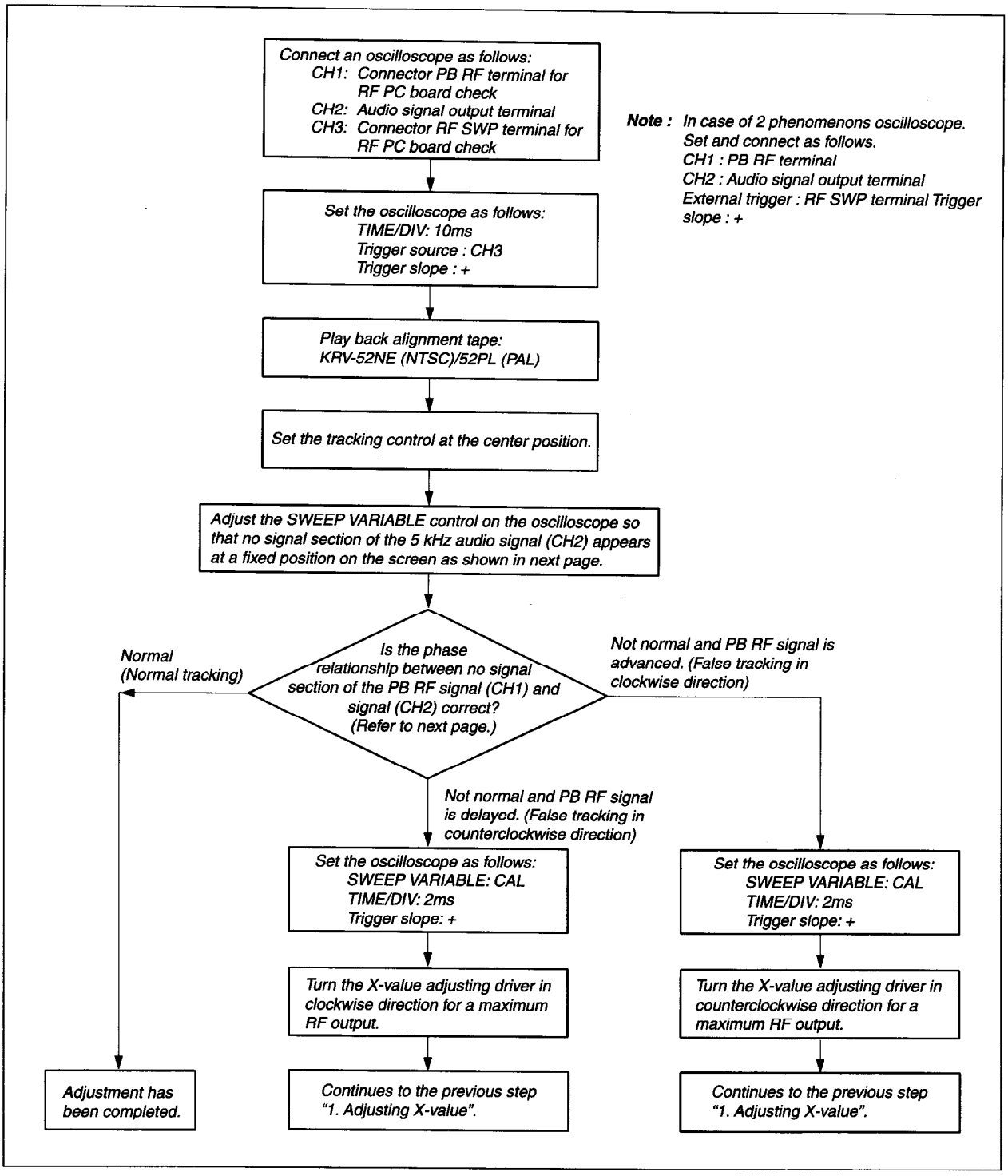

Connect an oscilloscope as follows:
CH1: Connector PB RF terminal for RF PC board check
CH2: Audio signal output terminal
CH3: Connector RF SWP terminal for RF PC board check
Note : In case of 2 phenomenons oscilloscope. Set and connect as follows.
CH1 : PB RF terminal
CH2 : Audio signal output terminal
External trigger : RF SWP terminal Trigger slope : +
Set the oscilloscope as follows:
TIME/DIV: 10ms
Trigger source : CH3
Trigger slope : +
Play back alignment tape:
KRV-52NE (NTSC)/52PL (PAL)
Set the tracking control at the center position.
Adjust the SWEEP VARIABLE control on the oscilloscope so that no signal section of the 5 kHz audio signal (CH2) appears at a fixed position on the screen as shown in next page.
Is the phase relationship between no signal section of the PB RF signal (CH1) and signal (CH2) correct? (Refer to next page.)
Normal (Normal tracking)
Not normal and PB RF signal is advanced. (False tracking in clockwise direction)
Not normal and PB RF signal is delayed. (False tracking in counterclockwise direction)
Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +
Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +
Turn the X-value adjusting driver in clockwise direction for a maximum RF output.
Turn the X-value adjusting driver in counterclockwise direction for a maximum RF output.
Adjustment has been completed.
Continues to the previous step "1. Adjusting X-value".
Continues to the previous step "1. Adjusting X-value".

Table. 4-2

Using the tape having the version No.

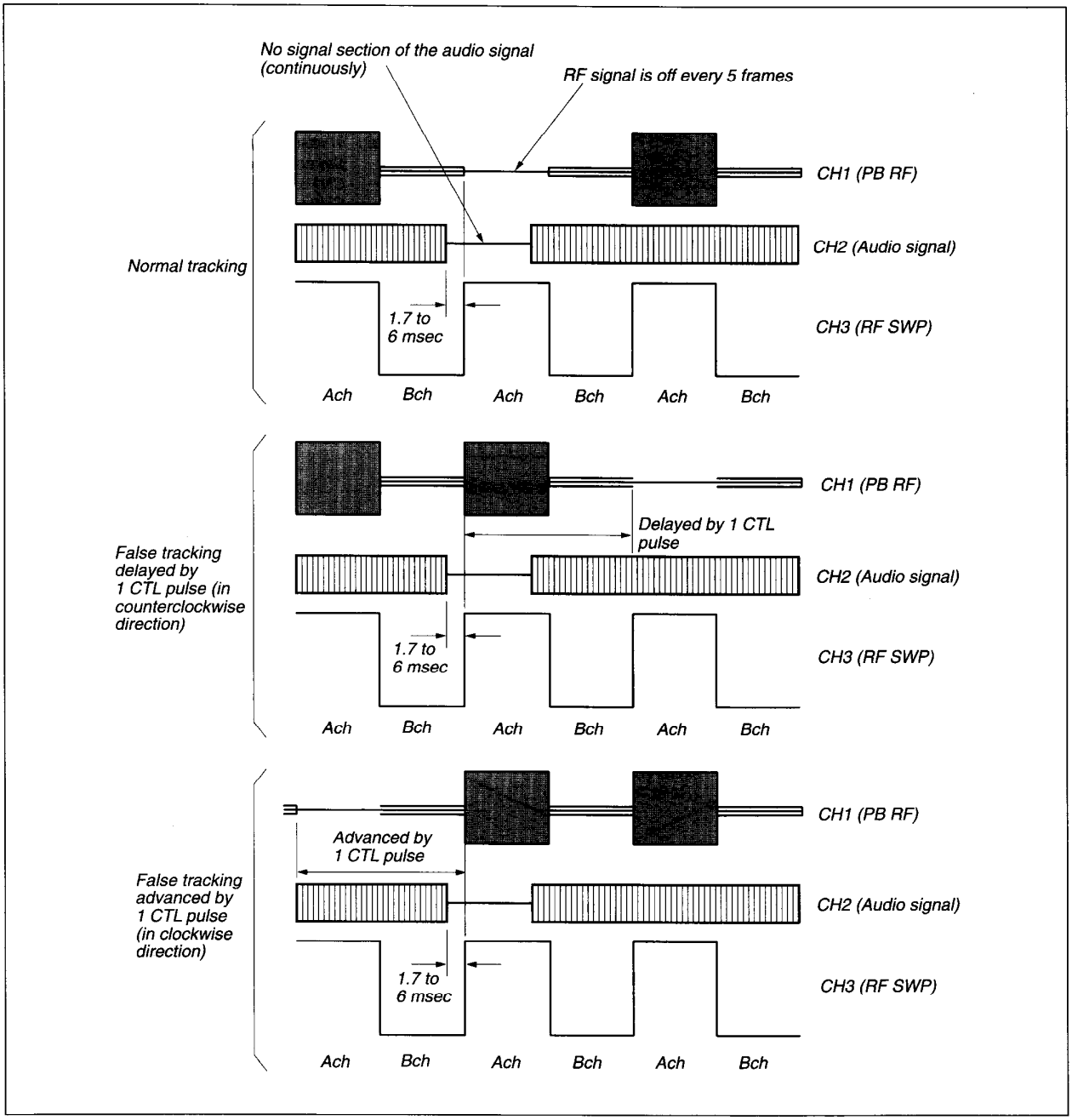


Table. 4-3

[Adjustment Method (*For the VCRs Equipped with Narrow Gap Video Heads)]

Set the tracking control at the center position. Set the ACE head position with X-value adjusting driver both where a maximum RF output is obtained and where the RF output decreases immediately when the ▲ tracking control key is pressed.

* TYPE OF DRUM
DZH-98A

1. Adjusting X-value
(Using the tape having the version No.)

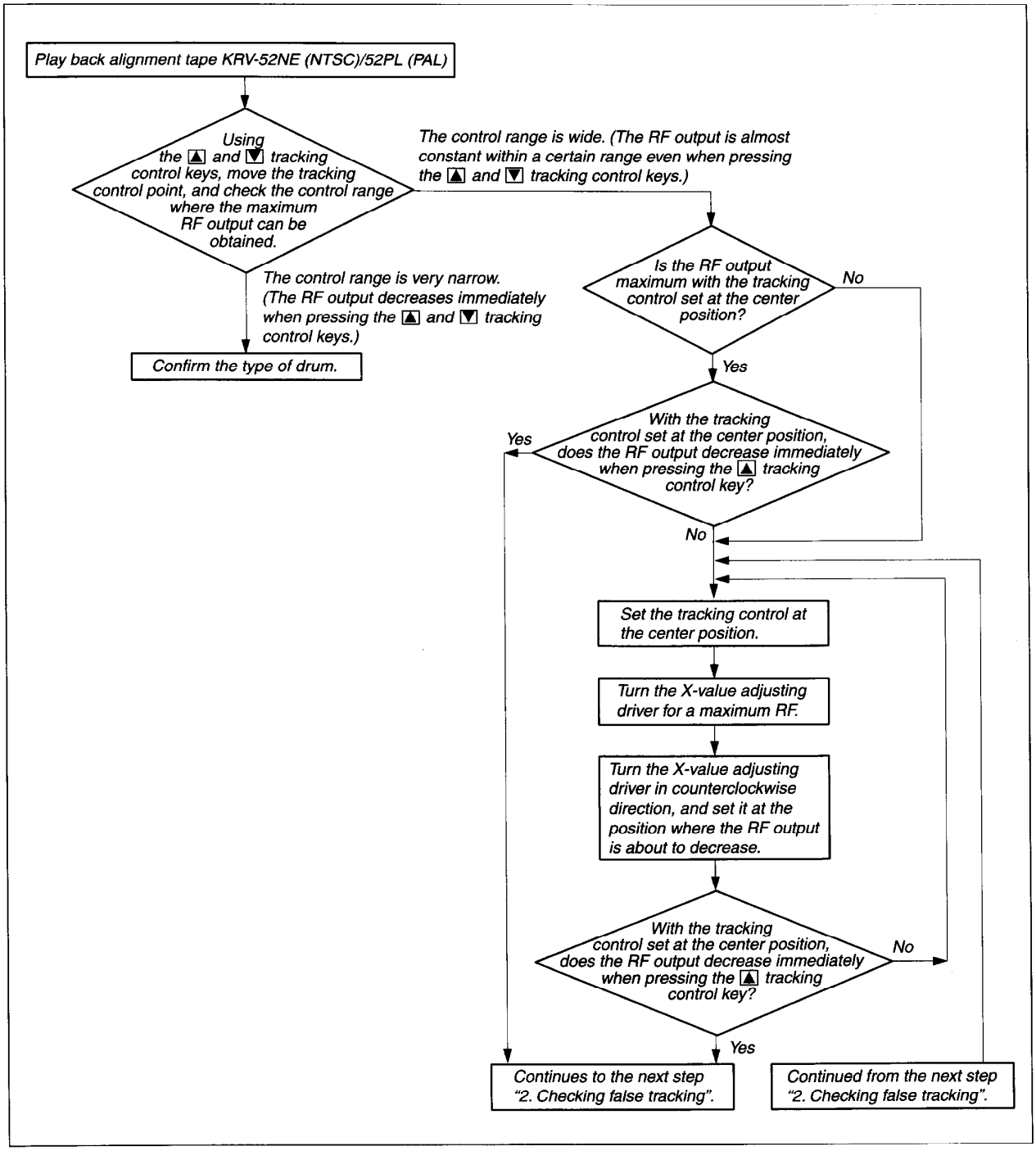

Play back alignment tape KRV-52NE (NTSC)/52PL (PAL)
Using the ▲ and ▼ tracking control keys, move the tracking control point, and check the control range where the maximum RF output can be obtained.
The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Confirm the type of drum.
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
Yes
No
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF.
Turn the X-value adjusting driver in counterclockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
No
Yes
Continues to the next step "2. Checking false tracking".
Continued from the next step "2. Checking false tracking".

Table. 4-4

2. Checking false tracking
(Using the tape having the version No.)

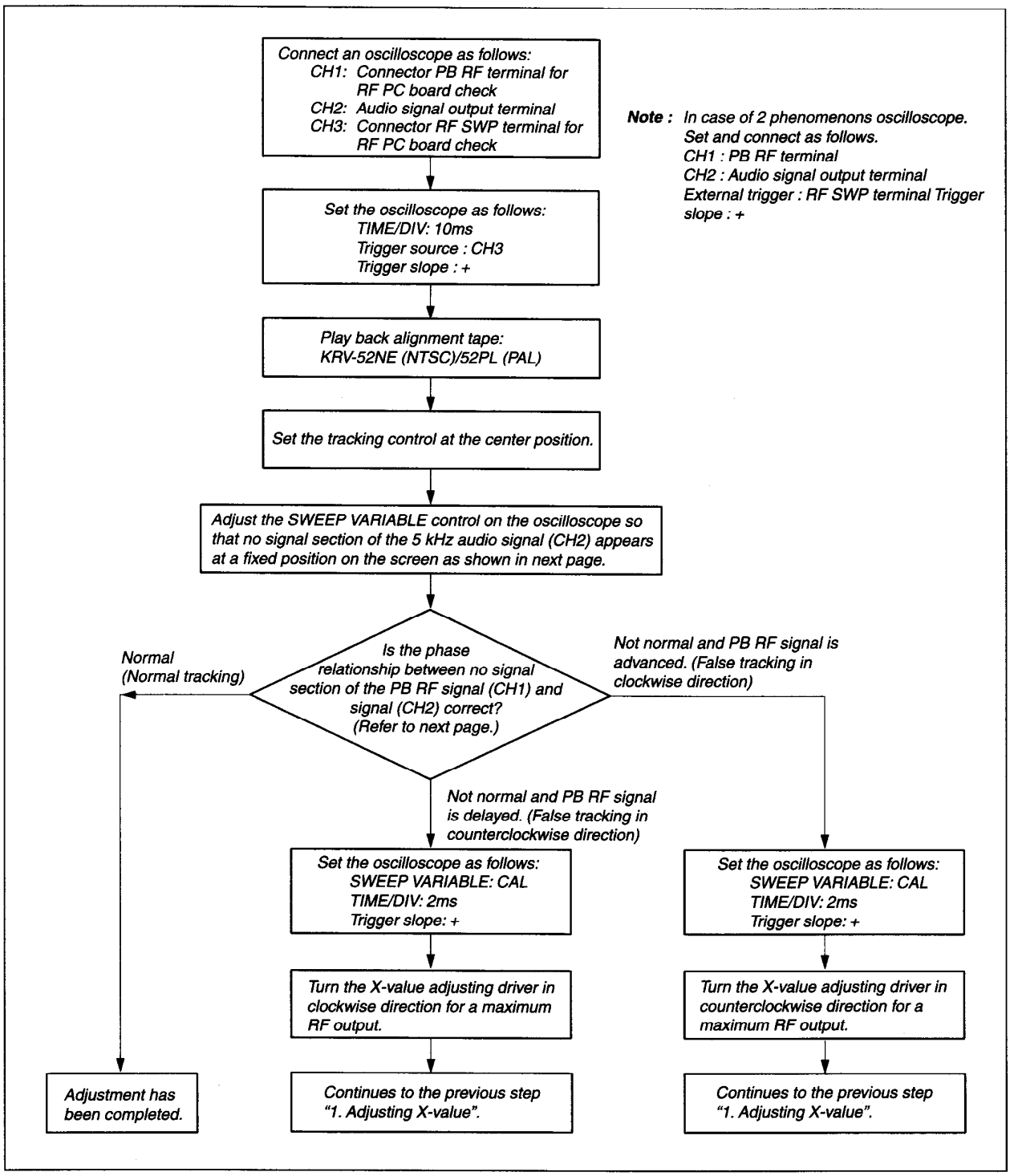

Connect an oscilloscope as follows:
CH1: Connector PB RF terminal for RF PC board check
CH2: Audio signal output terminal
CH3: Connector RF SWP terminal for RF PC board check
Note : In case of 2 phenomenons oscilloscope. Set and connect as follows.
CH1 : PB RF terminal
CH2 : Audio signal output terminal
External trigger : RF SWP terminal Trigger slope : +
Set the oscilloscope as follows:
TIME/DIV: 10ms
Trigger source : CH3
Trigger slope : +
Play back alignment tape:
KRV-52NE (NTSC)/52PL (PAL)
Set the tracking control at the center position.
Adjust the SWEEP VARIABLE control on the oscilloscope so that no signal section of the 5 kHz audio signal (CH2) appears at a fixed position on the screen as shown in next page.
Is the phase relationship between no signal section of the PB RF signal (CH1) and signal (CH2) correct? (Refer to next page.)
Normal (Normal tracking)
Not normal and PB RF signal is advanced. (False tracking in clockwise direction)
Not normal and PB RF signal is delayed. (False tracking in counterclockwise direction)
Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +
Set the oscilloscope as follows:
SWEEP VARIABLE: CAL
TIME/DIV: 2ms
Trigger slope: +
Turn the X-value adjusting driver in clockwise direction for a maximum RF output.
Turn the X-value adjusting driver in counterclockwise direction for a maximum RF output.
Adjustment has been completed.
Continues to the previous step "1. Adjusting X-value".
Continues to the previous step "1. Adjusting X-value".

Table. 4-5

Using the tape having the version No.

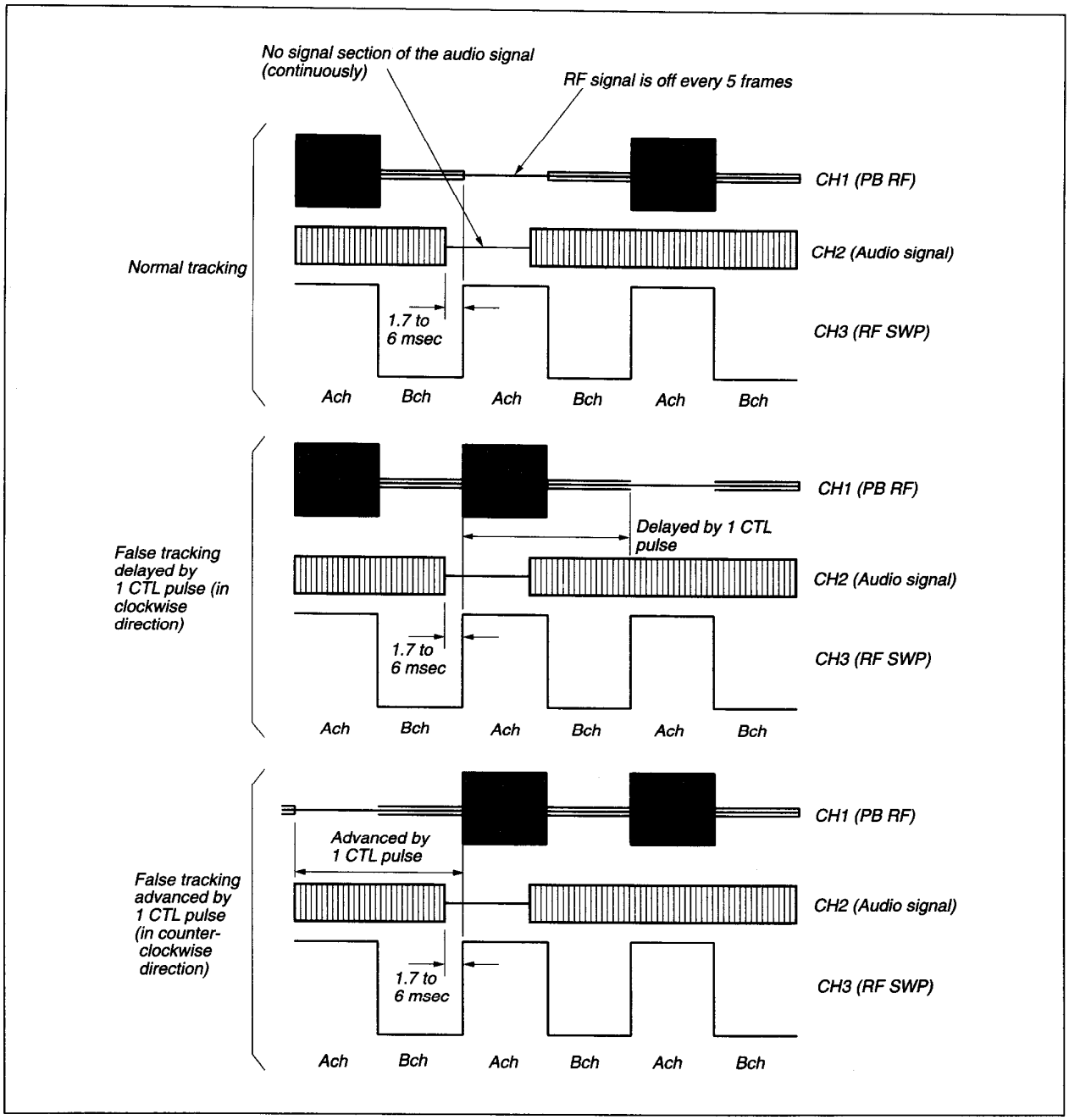

No signal section of the audio signal (continuously)
RF signal is off every 5 frames
Normal tracking
CH1 (PB RF)
CH2 (Audio signal)
CH3 (RF SWP)
1.7 to 6 msec
Ach
Bch
False tracking delayed by 1 CTL pulse (in clockwise direction)
Delayed by 1 CTL pulse
False tracking advanced by 1 CTL pulse (in counter-clockwise direction)
Advanced by 1 CTL pulse

Table. 4-6

3-22. CAM MOTOR ASSEMBLY, LIMITER SELECTION ARM

1) Remove FL complete assembly. (Refer to 3-1.)
2) Remove rubber belt. (Refer to 3-4.)
3) Remove FL slider block assembly. (Refer to 3-12.)
4) Remove worm wheel. (Refer to 3-13.)
5) Remove pulley gear assembly with clutch gear. (Refer to 3-19.)
6) Remove and reel direct assembly. (Refer to 3-20.)
7) Remove cam motor retainer ① in the arrow Ⓑ while pushing its claw in the arrow Ⓐ direction.
8) Then cam motor assembly ② is out of place.
9) Remove the boss of limiter selection arm ③ from the hole on the mechanical chassis by pushing in the arrow Ⓒ direction and push it in the arrow Ⓓ direction and remove it in the arrow Ⓔ direction.

[Note on Mounting]

• Before attaching cam motor assembly ②, confirm the specified locations are coated with grease SG-646 (Ref. No. J-6).

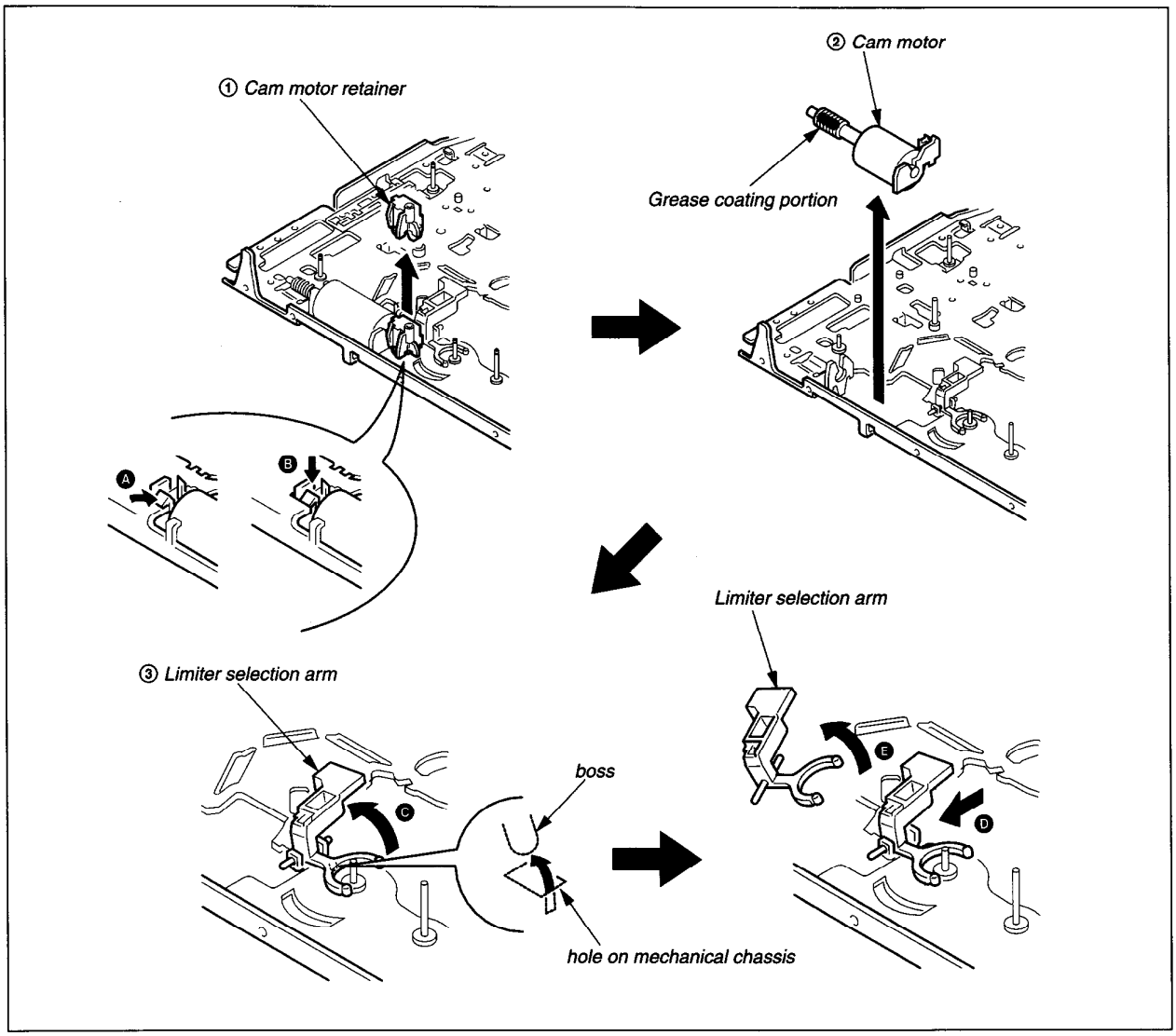


Fig. 3-27

Reference

• X-VALUE ADJUSTMENT
(Using KRV-52NE having no version No.)

Purpose : To obtain compatibility with other VCRs.

Precaution : Before starting to adjust X-value, set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys. Press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).

Mode	Playback
Signal	Alignment tape: KRV-52NE (For NTSC having no version No.)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH1: Connector PB RF pin for RF PC board check CH2 : Connector RF SWP pin for RF PC board check
Adjustment locations	ACE base assembly

[Adjustment Method]

Set the tracking control at the center position. For the VCRs equipped with standard gap video heads, set the X-value adjustment screw where a maximum RF output is obtained. For the VCRs equipped with wide gap video heads, set the X-value adjustment screw both where a maximum RF output is obtained and where the RF output decreases immediately when the ▼ tracking control key is pressed.

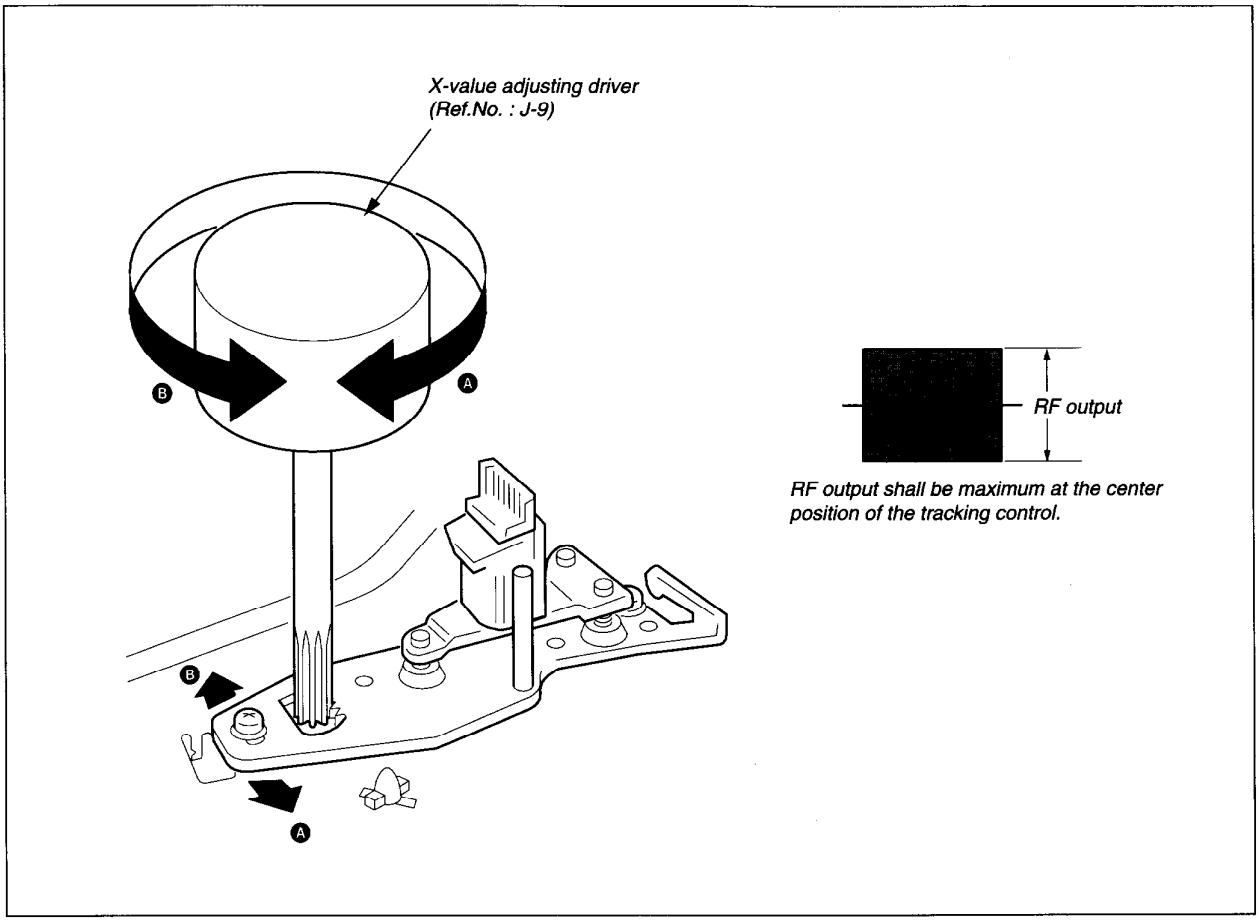


Fig. 4-3

X-VALUE ADJUSTMENT
(Using the tape having no version No.)

* TYPE OF DRUM

DZH-68D	DZH-89A
DZH-71D	DZH-90A
DZH-77A	DZH-91A
DZH-78A	DZH-92A
DZH-78B	

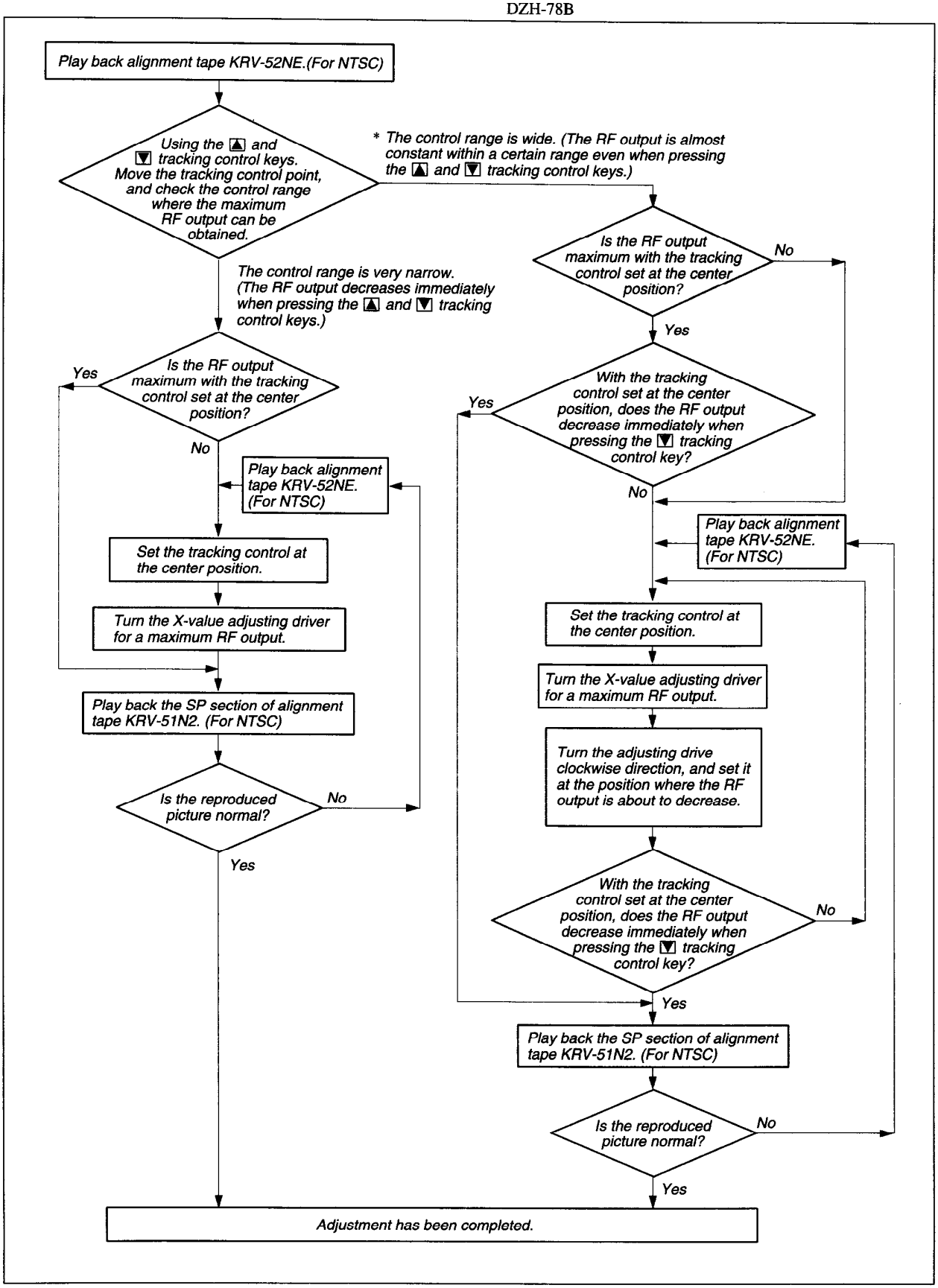

Play back alignment tape KRV-52NE.(For NTSC)
Using the ▲ and ▼ tracking control keys. Move the tracking control point, and check the control range where the maximum RF output can be obtained.
* The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
No
Yes
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Is the RF output maximum with the tracking control set at the center position?
Yes
No
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
Yes
No
Play back alignment tape KRV-52NE. (For NTSC)
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF output.
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF output.
Turn the adjusting drive clockwise direction, and set it at the position where the RF output is about to decrease.
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▼ tracking control key?
No
Yes
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Adjustment has been completed.

Table. 4-7

[Adjustment Method (*For the VCRs Equipped with Narrow Gap Video Heads)]

Set the tracking control at the center position. Set the ACE head position with X-value adjusting driver both where a maximum RF output is obtained and where the RF output decreases immediately when the ▲ tracking control key is pressed.

* TYPE OF DRUM
DZH-98A

Using the tape having the version No.

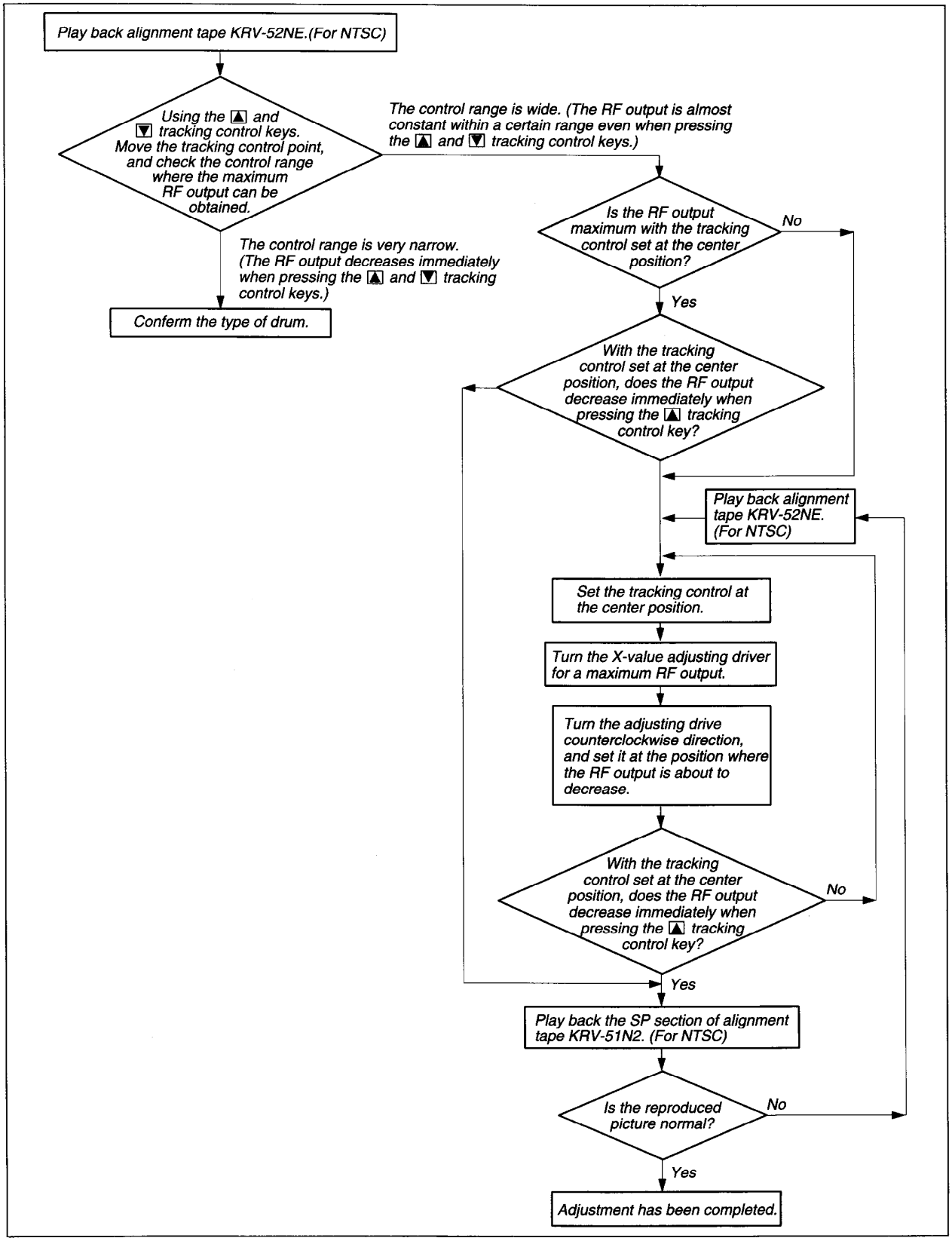

Play back alignment tape KRV-52NE.(For NTSC)
Using the ▲ and ▼ tracking control keys. Move the tracking control point, and check the control range where the maximum RF output can be obtained.
The control range is wide. (The RF output is almost constant within a certain range even when pressing the ▲ and ▼ tracking control keys.)
The control range is very narrow. (The RF output decreases immediately when pressing the ▲ and ▼ tracking control keys.)
Conferm the type of drum.
Is the RF output maximum with the tracking control set at the center position?
No
Yes
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
Play back alignment tape KRV-52NE. (For NTSC)
Set the tracking control at the center position.
Turn the X-value adjusting driver for a maximum RF output.
Turn the adjusting drive counterclockwise direction, and set it at the position where the RF output is about to decrease.
With the tracking control set at the center position, does the RF output decrease immediately when pressing the ▲ tracking control key?
No
Yes
Play back the SP section of alignment tape KRV-51N2. (For NTSC)
Is the reproduced picture normal?
No
Yes
Adjustment has been completed.

Table. 4-9

4-1-4. HEIGHT ADJUSTMENT OF GUIDE ROLLERS NO. 3 AND NO. 6

Mode	Playback
Signal	Alignment tape: KRV-52NE (NTSC)/52PL (PAL)
Measuring instrument	Oscilloscope TIME/DIV: 2ms Trigger source: CH2 Trigger slope: +
Measuring point	CH1: Connector PB RF pin for RF PC board check CH2: Connector RF SWP pin for RF PC board check
Adjustment locations	Height adjustment screw for No. 3 tape guide roller Height adjustment screw for No. 6 tape guide roller

[Adjustment Method]

The following adjustment shall be carried out after completed Section 4-1-2. X-VALUE ADJUSTMENT.

1) Deactivate the automatic tracking control, and set the tracking control at the center position. To set the tracking control at the center position for the VCRs equipped with the ▲ and ▼ tracking control keys, press both the ▲ and ▼ tracking control keys at the same time. For the VCRs not equipped with the tracking control keys, deactivate the automatic tracking control by pressing the tracking AUTO/MANUAL key on the remote control unit during threading operation (after a tape is inserted but before the VCR starts playing back the tape).
2) Check if the RF output changes in amplitude by pressing the tracking control key. The RF output should change periodically (changes from a minimum amplitude to a maximum amplitude, and to the minimum amplitude again).

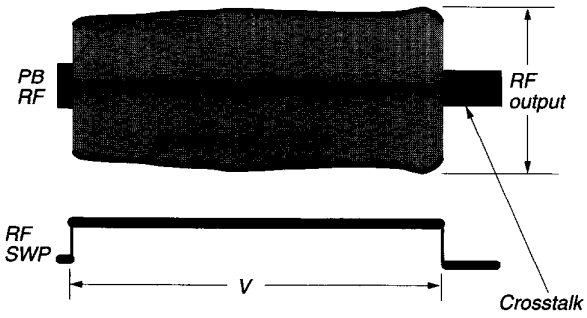


Fig. 4-4

3) Turn the height adjustment screws of tape guide rollers No. 3 and No. 6 so that the RF output envelope becomes as flat as possible.
4) Press the ▲ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.
5) Press the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.

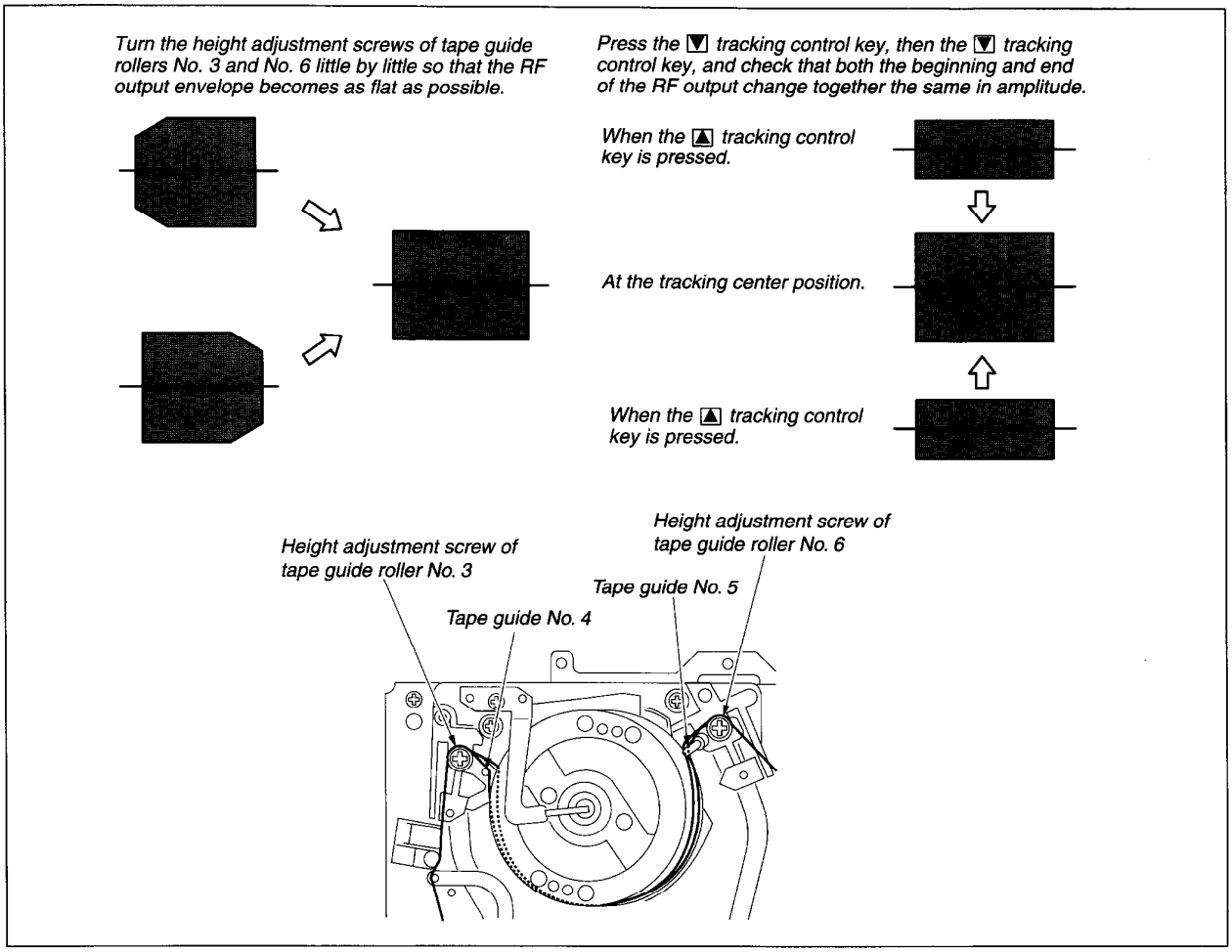

Turn the height adjustment screws of tape guide rollers No. 3 and No. 6 little by little so that the RF output envelope becomes as flat as possible.
Press the ▼ tracking control key, then the ▼ tracking control key, and check that both the beginning and end of the RF output change together the same in amplitude.
When the ▲ tracking control key is pressed.
At the tracking center position.
When the ▲ tracking control key is pressed.
Height adjustment screw of tape guide roller No. 3
Height adjustment screw of tape guide roller No. 6
Tape guide No. 5
Tape guide No. 4

Fig. 4-5

4-1-5. ACE HEAD ASSEMBLY HEIGHT AND AZIMUTH ADJUSTMENT

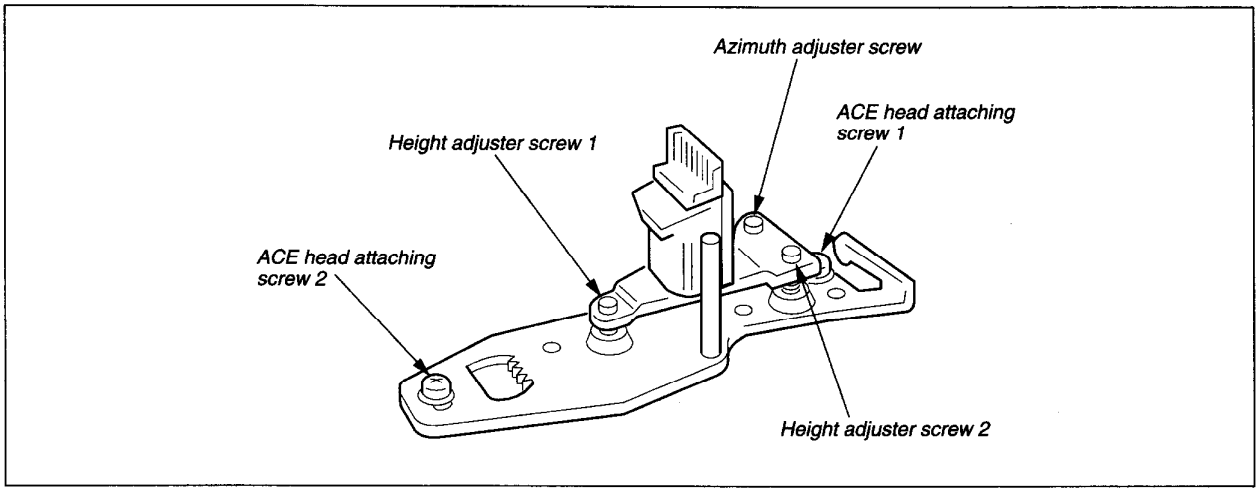

Azimuth adjuster screw
ACE head attaching screw 1
Height adjuster screw 1
ACE head attaching screw 2
Height adjuster screw 2

Fig. 4-6

Mode	Playback
Signal	Alignment tape: (5kHz) KRV-52NE (NTSC)/52PL (PAL)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw, Height adjuster screws 1 and 2.

[Adjustment Method]

1) Adjust the height as shown in the figure with turning the height adjuster screws 1 and 2, and the azimuth adjuster screw in the same direction, the same degree gradually.

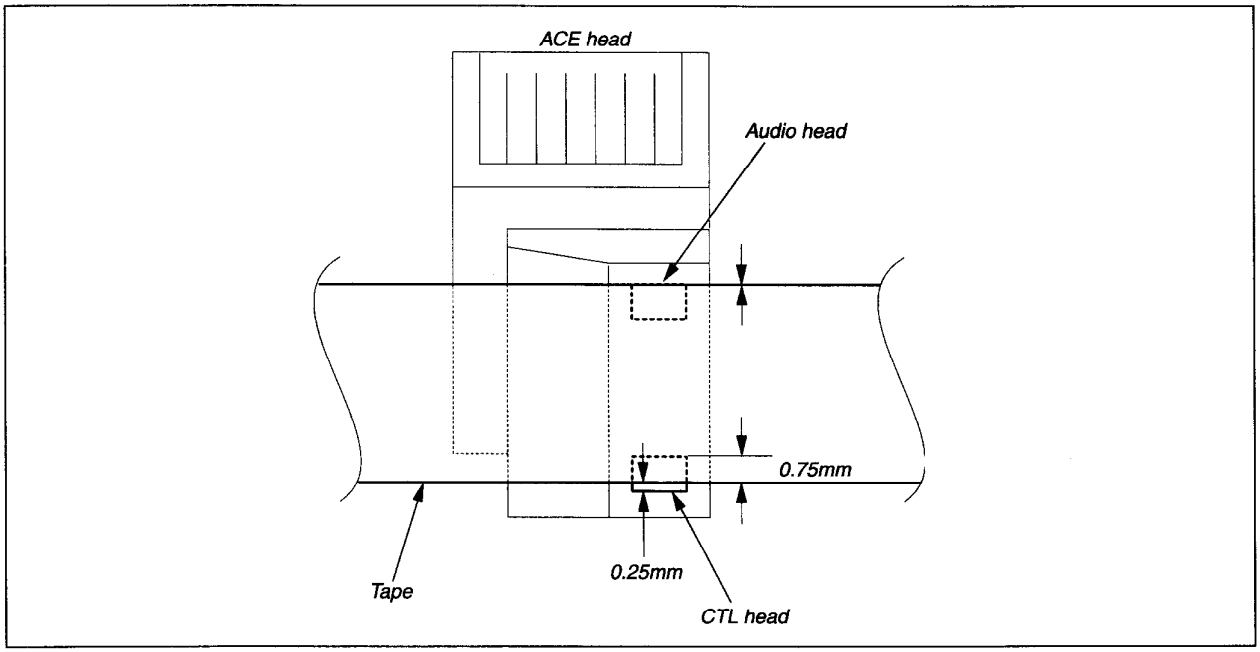


Fig. 4-7

2) Alternately adjust the azimuth adjuster screw to make A maximum and B minimum. (To maintain even audio output at maximum with minimum deviation.)
3) Perform section 4-1-2. X-VALUE ADJUSTMENT.
4) Tighten ACE head attaching screw 2. (Torque: More than 0.29 N•m (3.0 kg•cm)).

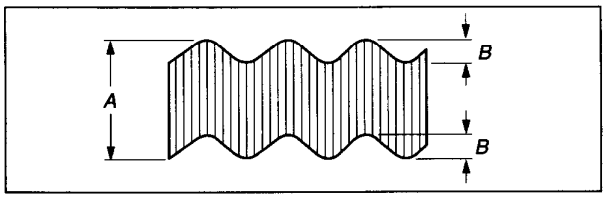


Fig. 4-8

4-1-6. X-VALUE FINE ADJUSTMENT

The procedure is the same as the item 4-1-3. Please refer to pages 37 to 46.

4-1-7. HEIGHT ADJUSTMENT OF GUIDE ROLLER NO. 8

Note : Applicable to the set having TG8 height adjusting screw as shown in the figure. Do not adjust when TG8 height adjusting screw is not attached.

Mode	Playback
Signal	Any signal on thin tape (T-160 or the like) near the tape top.
Adjustment location	TG8 height adjusting screw

[Adjustment Method]

1) Confirm there is no wrinkles of tape between TG8 and capstan and no tape curl at the upper or the lower flanges of TG8 during 10 seconds CUE running.
2) When there is curls or wrinkles, adjust with TG8 height adjusting screw.
3) Confirm there is no wrinkles of tape between TG8 and capstan and no tape curl at the upper or the lower flanges of TG8 during 8 seconds REV running.
4) When there is curls or wrinkles, adjust with TG8 height adjusting screw.

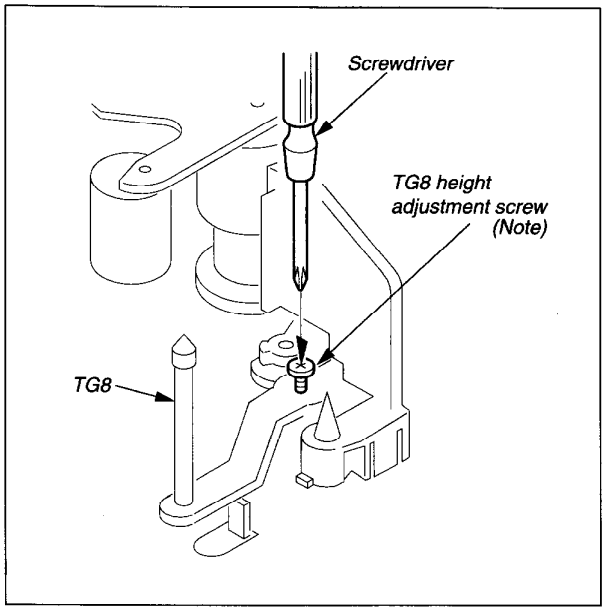


Fig. 4-9

4-1-8. CHECKING THE LINEARITY AND FLUCTUATION OF THE RF OUTPUT

1) Set the RF output to the maximum level using the tracking buttons.

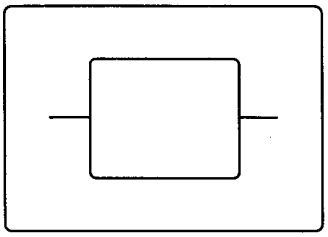


Fig. 4-10-1

2) Perform fine adjustment of the voltage level range of the oscilloscope, adjust the RF output deviation to within 6 gradations.

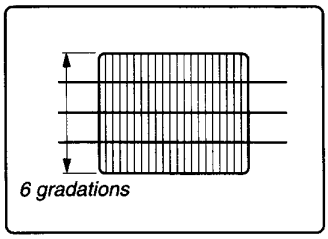


Fig. 4-10-2

3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 4 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.

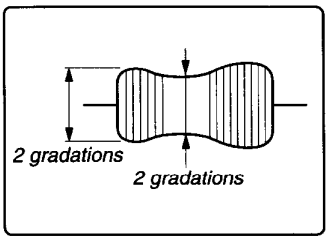


Fig. 4-10-3

5) Check that RF output fluctuation between minimum and maximum levels is within 13%.

5. EXPLODED VIEWS

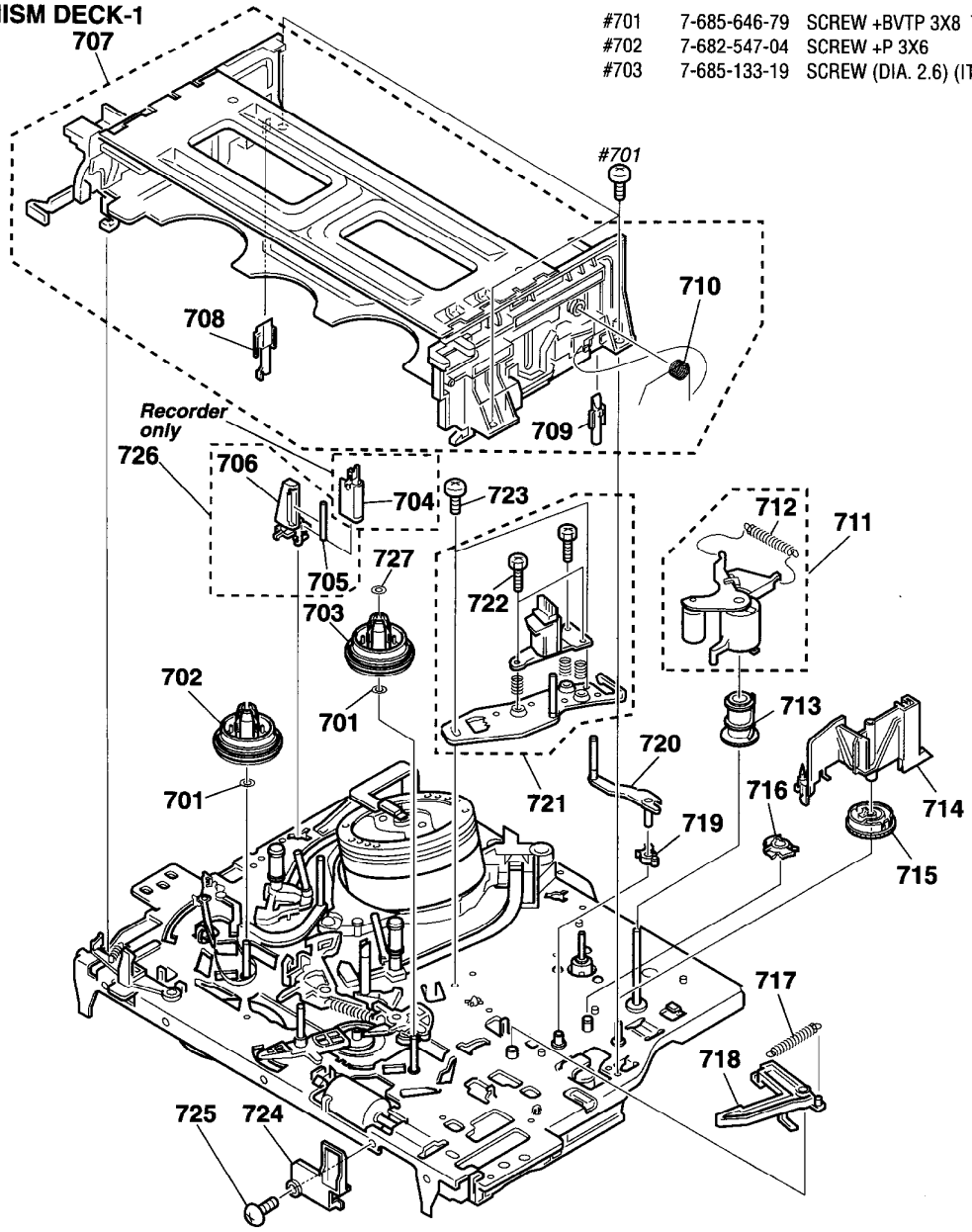
Note:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

****
HARDWARE LIST
****

#701	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#702	7-682-547-04	SCREW +P 3X6
#703	7-685-133-19	SCREW (DIA. 2.6) (IT3B)

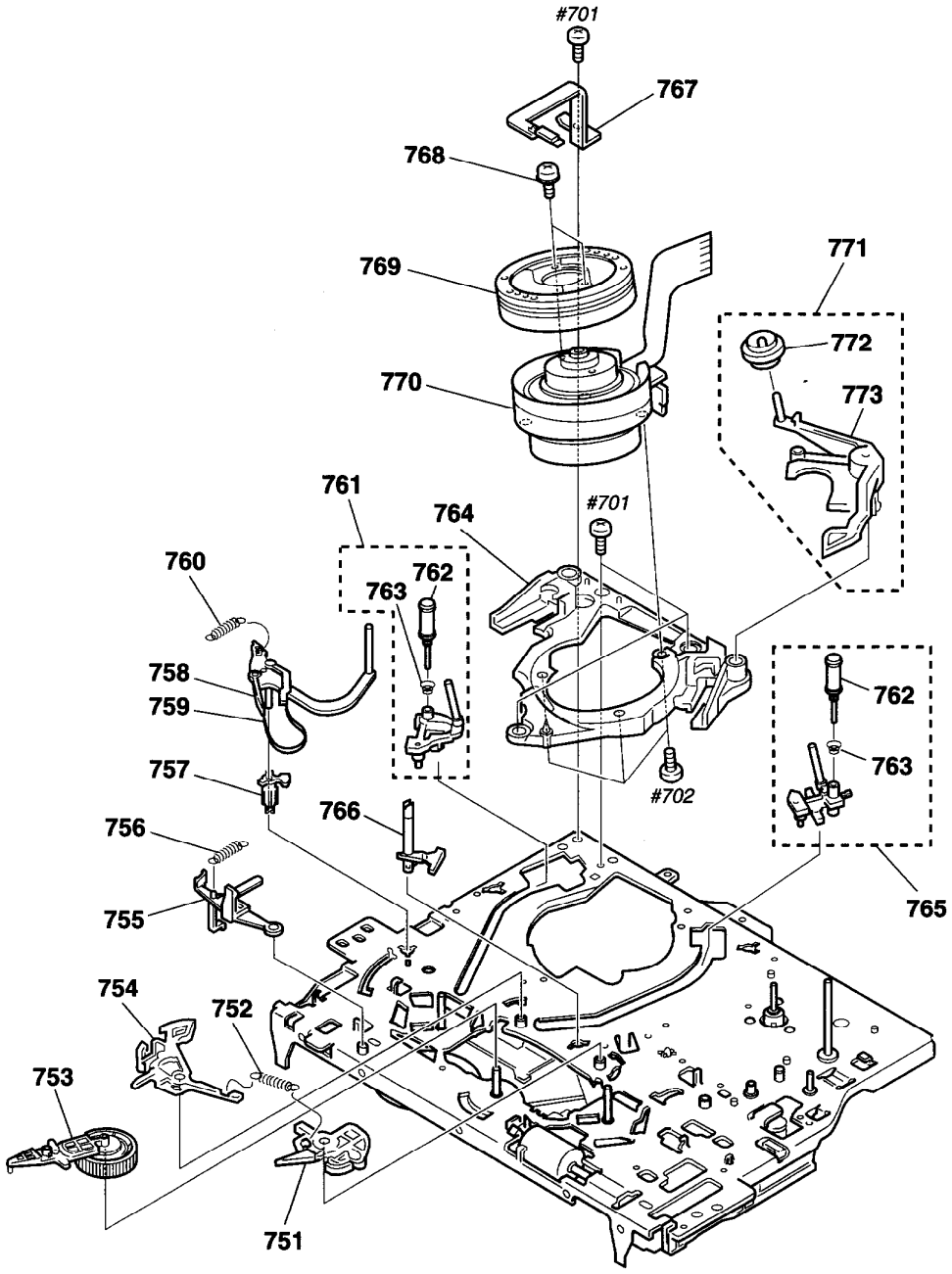
5-1. MECHANISM DECK-1



Ref. No.	Part No.	Description	Remarks
701	3-977-509-01	WASHER, THRUST	
702	3-977-507-01	TABLE, REEL (S) (GRAY)	
703	3-977-508-01	TABLE, REEL (T) (BLACK)	
704	1-500-144-11	HEAD, FE (RECORDER)	
705	3-977-495-01	SHAFT TG2 (RECORDER)	
706	3-977-494-01	HOLDER, FEH (RECORDER)	
707	A-6759-619-A	FL COMPLETE ASSY BOARD, COMPLETE	
708	3-977-535-01	PLATE, LUMINOUS(END SENSOR)	
709	3-977-536-01	PLATE, LUMINOUS(TOP SENSOR)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH	
712	3-958-455-01	SPRING (PINCH), TENSION	
713	3-977-447-01	GEAR, ELEVATOR	
714	3-977-514-01	OPENER, LID	

Ref. No.	Part No.	Description	Remarks
715	3-977-441-01	GEAR, PINCH PRESSING	
716	3-977-445-01	GEAR, TG8 ARM DRIVING	
717	3-977-465-01	SPRING,EXTENSION(RVS BRAKE)	
718	X-3947-582-1	ARM ASSY, RVS BRAKE	
719	3-977-446-01	GEAR, TG8 ARM	
720	X-3947-590-1	TG8 ASSY	
721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
723	3-979-508-01	SCREW	
724	3-978-485-01	PLATE, GUIDE CASSETTE	
725	3-696-519-01	+P IT3 SCREW 3X8	
726	X-3947-817-1	FEH, ASSY (PLAYER)	
727	3-977-443-01	WASHER, STOPPER	

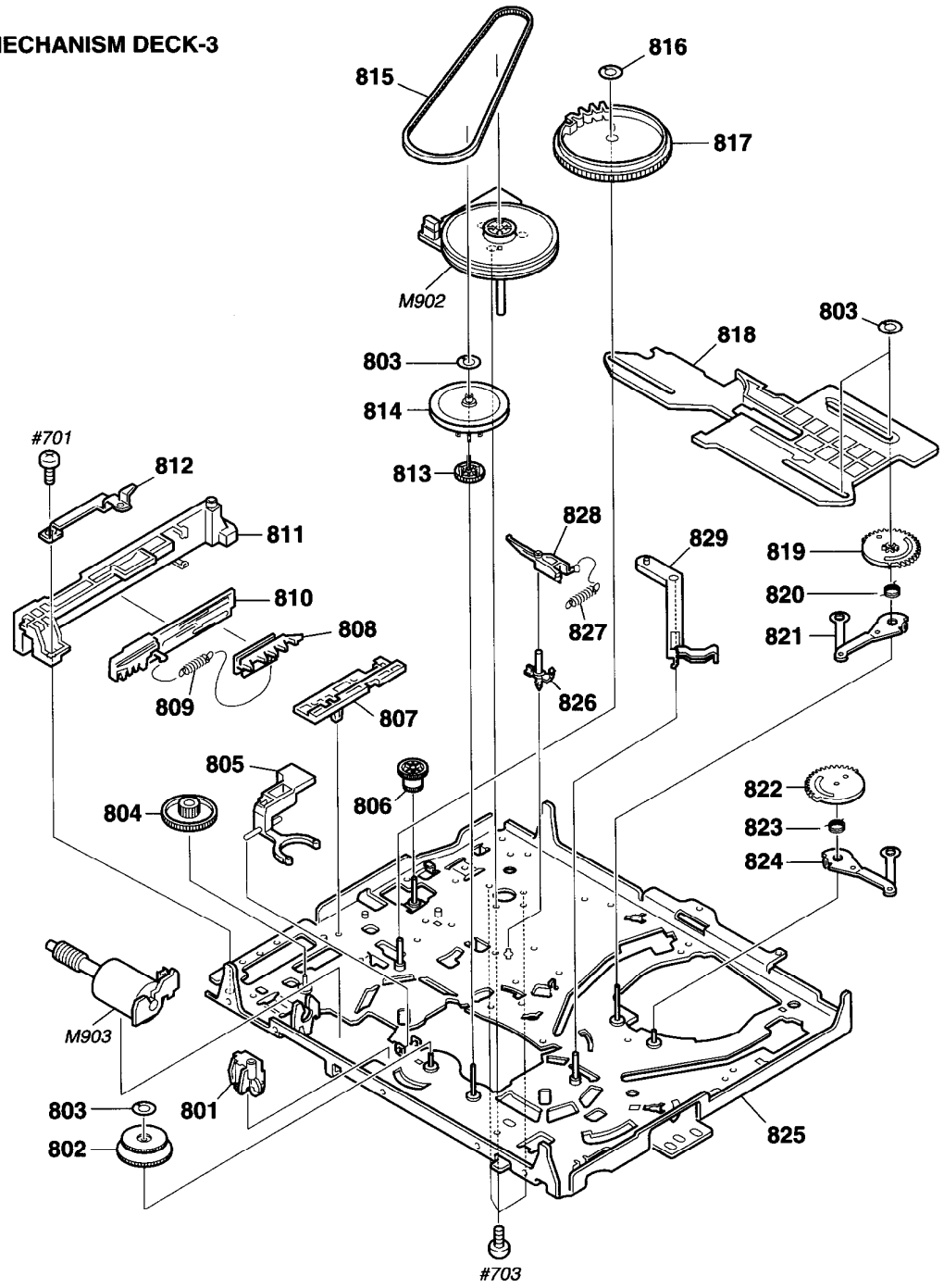
5-2. MECHANISM DECK-2



Ref. No.	Part No.	Description	Remarks
751	X-3947-581-1	BRAKE ASSY,MAIN(T)	
752	3-977-462-01	SPRING,EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-1	BRAKE ASSY, MAIN(S)	
755	3-977-513-01	LEVER, REC. PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE	

Ref. No.	Part No.	Description	Remarks
763	3-965-178-01	SPRING	
764	3-969-629-01	BASE, DRUM	
765	A-6750-325-A	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
767	X-3943-899-8	GROUND ASSY, SHAFT	
768	2-643-205-01	SCREW	
769	Refer to the service manual for each model.		
770	Refer to the service manual for each model.		
771	A-6759-614-A	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-977-537-01	ARM, HC ROLLER	

5-3. MECHANISM DECK-3



Ref. No.	Part No.	Description	Remarks
* 801	3-977-437-01	RETAINER,CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-01	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	

Ref. No.	Part No.	Description	Remarks
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	
819	3-977-455-01	GEAR, LOADING(T)	
820	3-977-456-01	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING(T)	
822	3-977-451-01	GEAR, LOADING(S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING(S)	
825	X-3947-576-1	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-01	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
M902	1-698-971-11	MOTOR, DC	
M903	X-3947-577-1	MOTOR ASSY, CAM	

9-921-647-13
(Including 9-921-647-11, -12(81))

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